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ON THE DISPENSING OF POWDERS FOR PRESCRIPTIONS.

By Thos. S. Wiegand.

In some of the recent issues of the drug journals the dispensing of medicines in powders has been made a subject of remark. While this form of exhibiting medicines is one of the simplest, it still must be admitted that as frequently done, even in stores of good reputation, there is a great deal of inaccuracy in the performance. In the preparation of the materials which, when compounded, form the remedy, the exact and thorough mixture of all the components frequently is not effected. Where morphine, arsenious acid, or corrosive sublimate are ordered, the division of any of these is secured by the use of a triturate of the active remedy with sugar of milk, using eight grains of the triturate to represent one grain of the remedy; these triturates are frequently kept on hand, thus making the diffusion eight times more certain.

The order in which the materials are put into the mortar is quite important, and the kind of mortar used is also to be regarded; a close-grained porcelain mortar free from any uneven places, or little flaws or holes, should always be selected for the purpose.

A small portion of sugar of milk or the mildest ingredient is triturated in the mortar to prevent the active ingredient from adhering to the surface; after this the most active remedy is added and rubbed with that already in the mortar until thoroughly mixed, when the other active ingredients are to be added, each being well mixed with the others, and, lastly, the remainder of the least active material is added and thoroughly mixed.

The proper division of the powder into the number of papers directed is next to be accomplished. Very ingenious apparatus have

been made to effect this purpose, but as yet few have been sold so far as my experience extends. The commonest way for dividing and the least reliable is to guess at it by taking out on the end of the spatula about as much as the operator thinks will make the proper quantity for one paper, and having distributed the whole quantity into the number of papers ordered, those which *seem* to be either too light or heavy are corrected; this it need only be said is *guessing* about the division.

Another and much better method is to spread the powder to be divided upon a ground-glass plate, arrange it into a parallelogram of even thickness, and mark off the number of parts into which it should be divided with a straight edge spatula across the plate. Those who practice this method succeed in making divisions that are within a fraction of a grain. Greater accuracy can be attained by using a glass slab to the underside of which has been pasted a piece of letter paper upon which have been ruled six or eight parallel lines; at right angles to these an equal number of lines have also been ruled, all at equal distances; at the margins of the paper the numbers 1, 2, 3, etc. are made between the lines so that any given number can be made by multiplying one number by any other that will give the desired number of powders. When odd numbers such as 13, 17 or 19 are ordered the best plan is to weigh off the 13th, 17th, or 19th of the whole weight and then the remainder will be very readily divided in the manner above described. For those who prefer a more finished affair than that just described, the glass slab should have the edges bevelled, and the lines etched on it, the figures being engraved on the bevelled edge.

HYPOPHOSPHOROUS ACID AND THE OFFICINAL HYPOPHOSPHITES.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 55.

II. EXAMINATION OF OFFICINAL HYPOPHOSPHITES.

Before taking up this part of the subject a correction must be made and some additional experiments recorded under the bromine method. On page 332 the value of 1 cc. NaOH is stated to be 0·01685 gm. KH_2PO_2 this should be 0·01735; the additional experiments have reference to some impurity in the bromine used which necessitates a

correction to be made, otherwise too high results will be obtained. If 1 cc. of bromine (the quantity usually taken for a determination of hypophosphite) be moderately warmed with 100 cc. water for one-half hour and then, by boiling, the bromine entirely volatilized, while the solution is neutral to litmus indicating the absence of acids, the addition of a few drops of phenolphthalein is the cause of a greenish color and, after adding more indicator 0·3 cc. NaOH had to be added to produce an alkaline reaction. This correction (the subtraction of 0·3 cc. NaOH from the quantity of NaOH needed to neutralize the acids formed in the oxidation) had to be made in the examination of H_3PO_2, KH_2PO_2, NaH_2PO_2 and $Ca(H_2PO_2)_2$. When first using this method in the examination of ferric hypophosphite it was noticed, in boiling to free the solution from bromine, that the solution became opalescent without depositing a precipitate (it was since observed that by protracted boiling a precipitate will form); that the opalescence was not due to the presence of ferric phosphate was proven by the prolonged boiling of the simulated mixture, made without the use of bromine, giving a perfectly clear solution. Discovering the impurity in the bromine as described above, the probability that the cause of the opalescence was to be found in the bromine was verified by experiment and at the same time the correction for ferric hypophosphite ascertained. 10 gm. of a dilute ferric chloride solution were precipitated by addition of normal sodium hydrate until, after boiling, phenolphthalein indicated an alkaline reaction; it required 6.5 cc. NaOH. To 10 gm. of the same solution diluted to 100 cc. was added 1 cc. bromine and, after one-half hour's warming, the bromine expelled by boiling; the opalescence was noticed as soon the solution boiled actively; it required now 7 cc. NaOH to produce an alkaline reaction making a correction of 0·5 cc. NaOH necessary in the examination of ferric hypophosphite.

Using only the one sample of bromine in my work, it is impossible to state to what extent this impurity is met with in commercial bromine; but the above experience is sufficient to draw attention to a possible source of error in hypophosphite determinations.

The examination of the officinal hypophosphites disclosing a number of foreign substances some of which are difficultly estimated, the methods used are described as briefly as possible.

Hypophosphite determination.—With the *soluble salts* no difficulty whatever is encountered either with the $HgCl_2$ or the Br method.

The *insoluble salt*, $Fe_2 (H_2 PO_2)_6$ was the cause of much work, the result of which establishes the superiority of the bromine method and the unreliability of the $HgCl_2$ method in determining ferric hypophosphite. The objection to the latter method is that the insolubility of this salt demands it to be first brought in solution, by use of HCl, before the addition of $HgCl_2$; in dissolving, however, a portion of the ferric salt (more or less, depending on conditions) is reduced to ferrous, with simultaneous oxidation of the hypophosphite, which does not reduce mercuric chloride; hence, the results are low; if the hypophosphite be not dissolved the particles coming in contact with the separated mercurous chloride reduce this to metallic mercury and loss again results. If heat be applied to assist the solution of the iron salt, the results are still lower. One sample by Br method gave 98·80 per cent. $Fe_2(H_2 PO_2)_6$; with $HgCl_2$ method using 5 cc. HCl and 5 cc. water to dissolve the hypophosphite and then adding the $HgCl_2$ and 10 cc. water before heating, working as rapidly as possible, only 94·82 per cent. was obtained; working more leisurely in dissolving the salt 84·73 per cent. resulted. Another sample with Br gave 90·32 per cent.; with $HgCl_2$, as above, working rapidly, 89·28 per cent; applying a little heat in dissolving, 86·41 per cent.

The difficulties encountered in the Br method were too high results due partly to the bromine but, chiefly, to the ready decomposition of ferric phosphate in the titration with NaOH. No indicator was found with this salt which would indicate sharply the change of acid phosphate into normal phosphate: Phenolphthalein was useless because it only produces the red color in alkaline solution, even if a slight excess of NaOH was added this would instantly react with the ferric phosphate and a neutral solution result; by the time an alkaline reaction was obtained the greater part of the ferric phosphate had been decomposed; Methyl-orange and Tropaeolin OO do not appear to be sensitive towards acid phosphates even after addition of calcium chloride; Congo-red and Litmus, sensitive to acid phosphates after addition of calcium chloride (the former only after warming), can be made to give fair results but the end-reaction is rather indistinct owing to formation of lakes with the iron phosphate. This objectionable feature was overcome by completely decomposing the ferric phosphate by addition of normal NaOH to the boiling hot solution of ferric phosphate (after addition of the $CaCl_2$) until phenolphthalein indicated an alkaline reaction. This procedure, however, necessitated another determi-

nation *i. e.* the quantity of NaOH necessary to decompose the ferric hypophosphite (see determination of ferric oxide). To obtain the number of cc. of NaOH corresponding to the ferric hypophosphite, there must be subtracted from the cc. NaOH required to indicate an alkaline reaction after oxidation, the correction due to the bromine and the number of cc. NaOH necessary to precipitate the ferric oxide from the ferric hypophosphite taken. One other precaution must be observed with this salt, it is best obtained in solution by using 10 cc. water with sufficient bromine, applying slight heat and agitating well until dissolved, then diluting with water to 100 cc. and boiling as with the soluble salts.

The results of these determinations were always calculated as the hypophosphite of the metal taken, and if after the determination of the impurities the figures fell short of 100, the determination of phosphoric acid (after oxidation) was undertaken so as to estimate the quantity of phosphite by the method given on page 327. Regarding the qualitative test for phosphite mentioned on page 326, an unfavorable opinion previously formed was strengthened, as a sample containing quantitatively 13·34 per cent. phosphite gave no precipitate with the test, and a sample of hypophosphorous acid, free from phosphorous acid, but containing sulphuric acid giving a heavy precipitate.

Water determination, by drying about two gm. at 120° C.

Sulphuric acid determination, by use of $BaCl_2$ and HCl.

Hydrochloric acid determination presents some difficulties in the presence of hypophosphites owing to the reduction of silver nitrate by the latter. It can be detected and estimated by dissolving the salt in nitric acid, sp. gr. 1·20, and adding $AgNO_3$ until a dark coloration sets in, stirring actively to coagulate the precipitate, adding a little more silver nitrate and, after coagulating the precipitate, diluting with water and filtering through a small plug of absorbent cotton. The precipitate is well washed and the AgCl dissolved out by pouring ammonium hydrate through the cotton and re-precipitated by adding nitric acid to the filtrate.

Carbonic acid determination, qualitatively by effervescence on addition of a stronger acid, quantitatively by addition of a known excess of normal oxalic acid, boiling and titrating the excess of oxalic acid; the deficiency of NaOH is calculated as carbonate.

Phosphoric acid is determined in *soluble hypophosphites* by warming with HCl to decompose any carbonate that may be present, adding

a few drops of $CaCl_2$, and rendering slightly alkaline with ammonia; a flocculent precipitate indicates phosphate. Carried out as stated this test is a good one; if *phosphite* is present a *decided excess* of ammonium hydrate will also cause a precipitate, but this will be crystalline. This test can be made quantitative if desirable by using an excess of $CaCl_2$ to precipitate all of the phosphoric acid, as $Ca_3(PO_4)_2$, on addition of ammonia, collecting the precipitate on a filter, washing, dissolving in HCl, adding an excess of ammoniacal solution of ammonium citrate (until the solution is alkaline and free from a precipitate) and precipitating with magnesia mixture. *Insoluble hypophosphites* are only satisfactorily tested for phosphate by preceding the above treatment by boiling with an excess of an alkaline hydrate and filtering.

Sodium and potassium recognized by flame tests; when present as impurities were estimated from the amount of unsaturated acids obtained in the analysis.

Calcium detected and estimated by white precipitate, insoluble in acetic acid, on adding ammonium oxalate; in ferric hypophosphite, after oxidation with Br, by addition of sufficient ammonium acetate to precipitate the ferric phosphate on boiling, filtering and adding ammonium oxalate.

Magnesium tested for by addition of NH_4Cl, NH_4OH and $(NH_4)_2CO_3$ boiling, filtering and adding to the filtrate $(NH_4)_2HPO_4$.

Ferric oxide determined by taking about one gram of ferric hypophosphite adding 25 cc. water, a few drops phenolphthalein and normal NaOH in the cold until a red color is imparted to the supernatant liquid; the mixture is then boiled and NaOH added, drop by drop, until the red color becomes permanent. Every cc. NaOH is the equivalent of 0·0266 gm. F_2O_3.

From the results of these various determinations was then calculated the composition of the hypophosphite.

Comparatively little work had been done on the hypophosphites before the fact was discovered that the samples did not run evenly in composition; the salt taken for analysis was afterwards always finely powdered in a warm mortar (to prevent absorption of moisture), thoroughly mixed and placed in small tightly-stoppered bottles or test-tubes, from which the small quantities required for analysis were taken, the weight being obtained by taking the difference in weight of bottle before and after taking the sample.

CALCIUM HYPOPHOSPHITE.

This salt is directly or indirectly the source of the officinal hypophosphites, as well as of the commercial acid; hence its purity is an important factor in considering the purity of its preparations. Four samples were examined:

	I.	II.	III.	IV.
$Ca(H_2PO_2)_2$	99·48 [1]	98·27	98·40	98·10
$CaSO_4$	0·55	1·30	1·53	1·59
$CaCO_3$	Merest trace.	0·35	Trace.	0·31

The insoluble portion of these samples was found to consist of carbonate only, due to the small quantity of $Ca(OH)_2$ soluble in water not having been thoroughly removed, and which, during evaporation was changed by atmospheric carbon dioxide into calcium carbonate. This is an impurity which is so easily removed that the U. S. P. is right in requiring a completely soluble salt. A little CO_2 passed through the filtrate after separating the excess of lime and calcium phosphate, boiling and filtering again is all that is required; there are two filtrations necessary in the ordinary method of preparation, so the only additional expense will be for the CO_2.

The test for *soluble phosphate* in the U. S. P., considering the presence of sulphate in all samples, might give rise to wrong conclusions; again, soluble phosphate of calcium is an *acid* salt and not likely to be found if an excess of lime was used in the preparation of the hypophosphite; granting its presence, the requirement of forming a *neutral* solution, which must not yield a precipitate on addition of ammonium hydrate to alkaline reaction, is a more appropriate and trustworthy test for phosphate.

POTASSIUM HYPOPHOSPHITE.

Made by double decomposition between calcium hypophosphite and potassium carbonate. Two specimens were examined.

	I.	II. [2]
KH_2PO_2,	73·88	98·21
H_2O,	1·89	0·49
KCl,	1·14	0·98
K_2SO_4,	trace.	0·33
K_2HPO_3,	13·34	. . .
K_2CO_3,	9·73	. . .

[1] Determined with $HgCl_2$ 99.48; with $K_2Mn_2O_8$ 99.56 and with Br. 99.52.

[2] Ca, a trace.

In No. 1 we have the first and only salt in which phosphite was present, and this did not yield a precipitate with acetic acid and lead acetate. 0·517 gram, after oxidation with Br, required 22·9 cc. NaOH for neutralization, to this must be added the value of 9·73 per cent. K_2CO_3, or, as NaOH, 0·73 cc., a total of 23·63 cc.; from this is subtracted the correction 0·3 cc., and the number of cc. of NaOH corresponding to the hypophosphite is 23·3, which, multiplied by 0·01735 and divided by 0·517, will give as the amount of KH_2PO_2 0·4047 gram, or 78·27 per cent. From the amount of magnesium pyrophosphate 82·66 per cent. KH_2PO_2 is calculated.

82·66 — 78·27 = 4·39 per cent. is the equivalent of K_2HPO_3, expressed as KH_2PO_2, and from which by proportion is obtained the amount of phosphite.

KH_2PO_2 : $2K_2HPO_3$ as the difference : x the amount of phosphite.
104·1 316·4 4·39 13·34 per cent.

The amount of KH_2PO_2 is, 78·27 the combined reducing value minus 4·39 the reducing value of 13·34 per cent. K_2HPO_3 or, 73·88 per cent.

SODIUM HYPOPHOSPHITE.

Prepared like the potassium salt and according to the U. S. P. should have one molecule water of crystallization. Three samples were examined, with results which lead to the suggestion that greater uniformity in the commercial article might be obtained by replacing the present officinal by the anhydrous salt.

	U. S. P. Formula.	I.	II.	III.[1]
NaH_2PO_2,	83·02	85·00	89.98	98·06
H_2O,	16·98	13·70	8·44	1·06
NaCl,	. . .	0·52	0·21	0·43
Na_2SO_4,	. . .	0·71	1·19	0 31

FERRIC HYPOPHOSPHITE.

For this salt two entirely distinct processes of manufacture have been published. 1. By double decomposition of ferrous sulphate and calcium hypophosphite; the calcium sulphate formed being but sparingly soluble is removed by filtration and the filtrate, containing ferrous hypophosphite, during evaporation is stated to yield ferric hypophosphite by oxidation of the ferrous salt. Apart from the wrong impression which is received from the above statement that the hypo-

[1] Ca, a trace.

phosphorous acid will remain unchanged while the ferrous condition is oxidized to ferric, there is another reason which it is strange to say, has never been advanced against the above process yielding the officinal product. In the change of ferrous salts into ferric there must always be added sufficient acid to satisfy the increased equivalence. When this acid is not supplied there will always be produced a basic salt (for illustrations the officinal solutions of ferric sulphate answer admirably). Assuming that, as in the above case, the oxidation is due to the oxygen of the air and does not affect the hypophosphorous acid, the change is written $2\ Fe\ (H_2PO_2)_2+O=Fe_2\ O\ (H_2PO_2)_4$ a basic salt; by the addition of the required quantity of acid there is produced, theoretically, the normal salt, $2\ Fe\ (H_2PO_2)_2+O+2\ H_3PO_2=Fe_2\ (H_2PO_2)_6+H_2O$. Further comment is hardly necessary.

2. By double decomposition of solution of ferric chloride or sulphate and sodium hypophosphite. This method gives the desired officinal product but is subject to some practical difficulties. The freshly precipitated salt is quite soluble in water and by washing, to remove the sodium salt, there is very little of the hypophosphite left. From the analysis of two commercial samples (I and II) the manufacturers overcome this difficulty by very little washing, consequently, these preparations contain large quantities of sodium salts, in both cases the sulphate.

An excess of the iron salt also increases the solubility, while (in making a preparation described further on) the presence of excess of hypophosphite was found to diminish it.

Ferric hypophosphite being insoluble in alcohol and both ferric chloride and calcium chloride soluble, it was thought possible to make the salt by triturating calcium hypophosphite and a slight excess of solution of ferric chloride in the presence of alcohol and thoroughly washing the product with alcohol. The alcohol was afterward recovered by distillation. This preparation (III) was of light yellow color due probably to a little oxychloride of iron which apparently was formed; although containing a higher percentage of $Fe_2\ (H_2PO_2)_6$, the product was not at all deemed satisfactory.

Freshly precipitated ferric hypophosphite is flocculent in appearance but, allowed to stand sometime before filtering, becomes crytalline and quite insoluble in water, therefore permitting a thorough washing with little loss. Taking advantage of this and allowing for the purity of commercial hypophosphite of calcium (98 per cent.) and the decreased

solubility of ferric hypophosphite in presence of a slight excess of calcium hypophosphite the product (IV) of the following process was found to be a very pure salt.

Calcium hypophosphite.....30 gm.
Solution of ferric chloride.....49·5 gm.
Distilled water, a sufficient quantity.

The calcium salt with 100 cc. water is placed in a flask and the iron solution gradually added, shaking after each addition. The ferric hypophosphite first forms a magma but, after a little time, separates as an agglutinated mass which must be disintegrated by brisk agitation. Agitation must be resorted to from time to time until the precipitate becomes crystalline and loses all tendency to cake, which change will require at least twenty-four hours; a better yield is probably obtained by allowing to stand two or even three days before filtering and washing. The washings are tested for Ca by addition of ammonium oxalate, and as long as a precipitate is obtained washing must be continued. It was noticed that as the washings became free from Ca they came through the filter a little cloudy and allowed to run into the vessel containing the first portions of the filtrate, after a little time, a distinct although a small precipitate was formed, due to the dissolved ferric hypophosphite being reprecipitated by the presence of a small quantity of calcium hypophosphite in the first filtrate. Using the above quantities and allowing to stand three days before filtering there was obtained a yield of 93 per cent. based upon the quantity of ferric chloride used.

	I.	II.	III.	IV.
$Fe_2(H_2PO_2)_6$	90·32	86·19	93·30	98·80
H_2O	2·82	0·71	4·70	0·65
$Fe_2(SO_4)_3$	3·20	5·92	——	——
Na_2SO_4	3.92	7·31	——	——
Fe_2Cl_6	——	——	0·68	0·66
Fe_2O_3	——	——	0·85	——
$CaSO_4$	——	——	0·66	——

The U. S. P. tests appear to be based upon the properties of the recently precipitated salt. The solution of all of the above samples in HCl and sodium citrate solution was obtained only after considerable agitation and time. The effect of boiling acetic acid forms little claim to the title of solvent; whilst calcium salts can be tested for in

the filtrate from the acetic acid treatment the insoluble residue is decidedly not what the U. S. P. states it to be—ferric phosphate. To detect phosphate in ferric hypophosphite I know of no more reliable method than that given elsewhere in this paper.

CANAIGRE.

By Henry Trimble.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 56.

The following account of a tanning material, which has several times in the past few years been mentioned as new, or as a possibility for the tanner, is undertaken with a view of relating what has been done toward developing this source, and at the same time calling attention to the fact that if we encourage home production we have in canaigre a material which gives promise of superseding the uncertain and much adulterated gambier.

Canaigre is found in large quantity in the sandy soil on both sides of the Rio Grande and northward over a large portion of Western Texas and New Mexico.

Its history is briefly as follows:—It is said to have been used in tanning by the Mexicans for over two centuries. Our first information, however, dates from July 9th, 1868, when a package of these roots was forwarded for Mr. John James, of San Antonio, Texas, to the Agricultural Department at Washington, together with a letter stating that Mr. F. Kalteyer, chemist in San Antonio, had found them to contain thirty-two per cent. of tannin. This sample was mislaid or overlooked until 1878, when it was reported on by the chemist.[1] It was then found to yield 23·45 per cent. of tannin. A fresh sample was also procured and the tannin estimated in the still fresh root with almost identical results, after making due allowance for difference in moisture. The other constituents reported at that time need not claim our attention at present further than to notice a considerable amount of starch, 18·00 per cent.

Previous to this publication by the Government, Mr. Rudolph Voelcker, of Galveston, Texas, published[2] an analysis of roots gath-

[1] Report of the Commissioner of Agriculture, 1878, p. 119.

[2] An Analysis of Raiz del Indio. American Journal of Pharmacy, 1876, p. 49.

ered in July, 1874. He found 23·16 per cent. tannin, and proved the presence of chrysophanic acid and aporetin. He was not aware of the botanical origin of the plant, but supposed it to belong to the natural order Polygonaceæ.

In 1879, Mr. Wm. Saunders[1] in his report on canaigre stated it was the *Rumex hymenosepalum* of Torrey, and furnished a lithographic plate of the plant in bloom.

At the New Orleans Exposition, 1885-86, in one corner of the section devoted to products from New Mexico were some of these roots, above which was the inscription, "A new tanning material."

As will be shown later, this exhibit, insignificant as it appeared, attracted the attention of at least one person.

In 1886[2], a sample of a root sent to me from San Antonio, Texas, under the name of "Indian Root," was analyzed and the results published under the title of "Yerba del Indio," from the impression it was the Aristolochia fœtida of the Mexican Pharmacopœia. This impression, however, was corrected by Professor J. M. Maisch in the same issue, page 115. He suggested, and it has since been found to be correct, that this "Raiz del Indio" was the canaigre root. That analysis fixed the amount of tannin at 11·66 per cent., but it was found that the root, which was not analyzed as soon as received, had commenced to decay and, later, it was completely riddled by insects. In this respect my experience differed from that of the Government chemist, who found no change after ten years.

Soon after the New Orleans Exposition samples of two or three hundred pounds were sent to Chicago for experiments in a number of tanneries there. Mr. E. C. Denig of that city has devoted much time since then to studying this material, from its source in Texas and New Mexico to its application in the tanning of hides.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long and one to three inches in diameter. Externally it is of a dark, reddish-brown color, becoming, by age, almost black; internally it is from a bright to a brownish-yellow according to age and amount of exposure to atmosphere. When collected the roots consist of clusters resembling sweet potatoes. They are found near the surface or sometimes on top of the ground, are rapidly dried and, at

[1] Report of the Commissioner of Agriculture, 1879, p. 364.

[2] An Analysis of Aristolochia fœtida. AMERICAN JOURNAL OF PHARMACY, 1886, p. 113.

a certain stage, cut into small pieces. If allowed to get very dry they become so hard as to resist any ordinary method of cutting. From samples of the whole and clipped root, kindly furnished me by Mr. Denig, I have found 17·33 per cent. of tannin. This figure is rather lower than that obtained by other investigators, but the deficiency may be explained by my sample containing more moisture. Dr. H. E. Sturcke[1] has found a total of 28·57 per cent. tannin.

The ground root is at present used in a number of tanneries and has been found to more closely resemble gambier in its action than any other tannin material. An extract has also been prepared and used which contains from forty to sixty per cent. tannin, and it is thought that in this form it will probably replace gambier. Should the hopes and efforts of those who are engaged in the development of this material be realized, we will have a source of tannin which is said to be inexhaustible, and which will be the means of either bringing a better gambier into this market or of driving it entirely out of use here. It is said that the dried and ground root can be delivered in any part of the United States at a price not exceeding three cents per pound.

Thus after a delay of twenty years this root has reached that stage of practical application when a useful future may be predicted for it, and the persistent efforts of the past four years have every prospect of being rewarded.

The presence of so much starch in a tanning material is, perhaps, without precedent, and there are good reasons why this is no disadvantage. The properties of the pure tannin have not been investigated, and it is not known whether canaigre red or gallic acid is the product of its decomposition. Crystals have been obtained by agitating an aqueous extract of the root with ether, which do not resemble either gallic acid or catechin.

This crystalline compound and the pure tannin are under investigation by me at the present time.

Phenylpropionic Acid, $C_9H_{10}O_2$.—Dr. C. T. Williams (Practitioner), has found it useful in the treatment of phthisical patients. The acid is insoluble in water, but dissolves in six parts of alcohol. From ten to twenty minims of this saturated solution, diluted with from one to two ounces of water, were given three times a day.

[1] *Shoe and Leather Reporter*, Oct. 27th, 1887, p. 862.

THE OILS OF WINTERGREEN AND BIRCH.

By Henry Trimble and Hermann J. M. Schroeter.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 57.

The history of these two oils has recently been written by Dr. E. R. Squibb[1] and the papers there referred to from the first in 1842 by Professor Procter to the last in 1884, by Mr. H. P. Pettigrew, can all be found in the American Journal of Pharmacy.

From a perusal of the papers by these two authors and that of Cahours[2] one finds that the oils are similar in physical properties, that they are largely composed of methyl salicylate, that one of them, oil of wintergreen, contains approximately 10 per cent. of a terpene according to Cahours, but only 0.3 per cent. according to Pettigrew, and according to the latter that the oil of birch is composed of methyl salicylate only, but according to Procter that the two oils are identical. On account of the variance of these authorities, and recent statements about the "Artificial Oil of Wintergreen," we have been led to investigate anew the chemical composition of the oils and in that way compare them. It is the exception when a product, as simple as oil of birch is described by Pettigrew to be, is produced in nature; such substances are more frequently found to be made up of a series of compounds. With this principle clearly in view, we procured four samples, two of each oil.

Sample I, wintergreen oil, was obtained through the kindness of Mr. C. M. Driggs, of White Haven, Penna., whose acquaintance with the distillers of that district enabled him to vouch for the genuineness of a sample of each.

Sample II, oil of birch, from the same source.

Sample III, oil of wintergreen, from Mr. Underhill, of New Hampshire.

Sample IV, oil of birch, this and sample III had been a number of years in the collection of Prof. J. M. Maisch, and were kindly given by him for this investigation. At least one of them, the wintergreen, was examined by Mr. Pettigrew.

Physical Properties.—The following tabular statement of the spe-

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[1] Ephemeris, October 1887, p. 951.

[2] *Ann. Chim. et Physique*, [3] x, p. 327.

cific gravities and boiling points shows a remarkable similarity among the samples in this respect.

Sample.	Boiling Point, C.	Specific Gravity at 15° C.
I. Wintergreen	216°	1·1838
II. Birch	217°	1·1840
III. Wintergreen	216°	1·1845
IV. Birch	217°	1·1840

Since these data have shown considerable variation at the hands of different investigators, we used every precaution to arrive at correct results, and from them one cannot but conclude that these figures could be of no practical value in distinguishing the oils.

Chemical Composition.—Two methods of saponifying these oils have been proposed, one by boiling for some hours with excess of concentrated potassium hydrate solution, which will be designated the *hot process*, and the other, proposed by Professor J. U. Lloyd,[1] by pouring the oil, slowly, with constant stirring, into a concentrated solution of potassium hydrate heated to 82° C.

It was noticed by Procter that when the oil of wintergreen was dissolved in potassium hydrate solution in the cold it formed a solid mass, from which the oil separated unchanged on the addition of hydrochloric acid. We found no separation of the oil after heating to 82° C. as directed by Lloyd, although several trials were made with both methods, and we finally adopted a modification of Lloyd's formula, using about one-half the potassium hydrate recommended in it, attaching the flask to an upright condenser and heating on a water-bath for one-half hour.

By this method we saponified about 800 grams of each oil. Both oils after saponification possessed a characteristic fragrant odor, entirely distinct from that of the oil. The clear solutions were agitated with purified petroleum ether, b. p. 25° to 45° C., and the process repeated with three portions on each. The aqueous solutions, after final separation from the petroleum ether, were almost free from odor, and were set aside for treatment with acid.

THE HYDROCARBONS.

The different portions of petroleum ether were mixed, keeping those from the two oils separate, the solvent in part recovered by distillation,

[1] U.S. Dispensatory, 16th edition, p. 100.

and the residues set aside to evaporate spontaneously. When the solutions had been reduced to a small bulk, they were transferred to small tared bottles, and, with stoppers removed, were heated for some hours in a water-bath to constant weight.

The yield was { from oil of wintergreen, 0·3 per cent.
" " birch, 0·447 "

Another portion of each oil was saponified by the *hot process*, in which the flasks containing the mixtures were attached to upright condensers and heated for several hours on sand-baths. The saponified oils were then distilled as long as oily drops separated from the distillates, and each of these distillates agitated with ether. The ethereal solutions were treated as the above petroleum ether extractions and the yield found to be { from oil of wintergreen, 0·22 per cent.
" " birch, 0·084 "

These residues, with those from the petroleum ether, correspond to the hydrocarbon noticed by Cahours in oil of wintergreen, and named by him *gaultherilene*.

The products from the two oils were similar in odor. They both solidified on standing for a day or two, or at once on cooling. That from wintergreen commenced to melt at 10°C. and was clear at 15°C., but the hydrocarbon from birch did not commence to melt below 18°C. and was clear at a few degrees above that temperature. The variation in yield may now be accounted for by supposing that the hydrocarbon in oil of birch exists in greater quantity, as shown by our method of extracting it, but in the *hot process*, in which distillation was used in the separation of the hydrocarbon, a part of that from the birch, probably not being so volatile, was left behind in the distillation.

Even with the comparatively large amounts of oils used the quantities of the hydrocarbons were necessarily limited, therefore they were reserved for a determination of their chemical composition, rather than risk the liability of loss in determining the specific gravity and boiling point.

It may be said, however, that both were lighter than water, and had boiling points near 200°C. No residues remained on the further ap plication of heat. Portions of each were dissolved in alcohol and the absence of traces of salicylic acid determined by ferric chloride.

Composition.—The hydrocarbon obtained by our method from oil

of wintergreen, Sample I., was submitted to combustion with the following results:

0·0981 gram substance gave 0·3122 CO_2 and 0·1048 H_2O.

Found.	Calculated for $C_{15}H_{24}$.
C, 86·79 per cent.	88·23 per cent.
H, 11·87 "	11·77 "
98·66	100·00

Vapor Density.—0·090 gram substance displaced 11·6 cc. air.

Found 6·73

Calculated for $C_{15}H_{24}$ 7·07

The combustion was repeated with a larger amount of substance, with almost identical results, and another determination of the vapor density of a sample from the same oil by the *hot process* gave 6·90.

The hydrocarbon from oil of birch, sample II, gave the following results on combustion. 0·1142 gram substance gave 0·366 CO_2 and 0·1201 H_2O.

C, 87·41 per cent.
H, 11·69 "

99·10

Vapor Density.—0·1121 gram substance displaced 14 cc. air.

Found 6·95

Calculated for $C_{15}H_{24}$ 7·07

Some of these determinations were duplicated without perceptible variation from the above.

The results point to the existence of gaultherilene in both oils, and that it is a sesquiterpene of the formula $C_{15}H_{24}$. The only doubt we feel, in concluding this, is the possibility of the vapor density being a coincidence, since the hydrocarbon may be composed of two or even more compounds, because it appears to be made up of a solid and a liquid portion.

THE ACIDS.

We next directed our attention to the alkaline solutions which were set aside for treatment with acid, and submitted them separately to the following treatment.

On the addition of chemically pure hydrochloric acid in slight excess, salicylic acid separated. This precipitate was collected on a

muslin strainer, washed with a little cold water, pressed, washed, pressed again and recrystallized from boiling water. The washings were concentrated, the acid as far as possible recovered, purified, mixed with the pressed lot and the whole dried at 60° C.

The dry mass was pulverized to reduce its bulk and then macerated successively with three portions of petroleum ether. The latter was partly recovered by distillation and the residue allowed to stand and become cool, when a crop of crystals of salicylic acid separated. After removing these the liquid was allowed to evaporate spontaneously; the crystalline residue from the evaporation, although small in amount, was purified by crystallizing several times from boiling water and petroleum ether, when the crystals became pearly in character, and gave the odor of benzoic acid when dissolved in boiling water. On the addition of ferric chloride solution only faint evidence of salicylic acid was obtained. The crystals from oil of wintergreen by this process melted at 125° C., and those similarly obtained from oil of birch melted at 124° C. It may be recalled that benzoic acid melts at 121·4° C.

The crystals from oil of wintergreen yielded the following results on combustion:

0·0712 gram substance gave 0·1771 CO_2 and 0·0311 H_2O.

	Found.	Calculated for Benzoic Acid.	Calculated for Salicylic Acid.
C,	67·84 per cent.	68·85 per cent.	60·87 per cent.
H,	4·85 "	4·92 "	4·34 "
O,	27·31 "	26·23 "	34·79 "
	100·00	100·00	100·00

Vapor Density.—0·0671 gram substance displaced 13·3 cc. air.

Found 4·36

Calculated for Benzoic Acid 4·23

" " Salicylic Acid 4·78

The crystals similarly obtained from oil of birch gave on combustion the following results:

0·0812 gram substance gave 0·2035 CO_2 and 0·035 H_2O.

C, 68·35 per cent.
H, 4·79 "
O, 26·86 "

100·00

Vapor Density.—0·0811 gram substance displaced 16·3 cc. air.

Found 4·30

Calculated for Benzoic Acid 4·23

THE ALCOHOLS.

The original liquid after separation of salicylic acid was repeatedly distilled and the first portion saved each time in order to recover the alcohol. This was finally macerated with and distilled from four lots of calcium oxide.

The alcohol from wintergreen had the sp. gr. 0·801 and boiled at 67° to 73° C. The alcohol from birch had the sp. gr. 0·8017 and boiled at 67° to 73° C. When submitted to the iodoform test, both quickly gave the characteristic odor, and, after standing, deposited yellow crystals of iodoform, indicating the presence of small quantities of ethyl alcohol.

ARTIFICIAL OIL OF WINTERGREEN.

This preparation has been manufactured and offered for sale by a few firms in recent years. So long as it is sold for what it really is, no objection can be attached to the sale of it. But the temptation to replace the true oils by the artificial product will grow stronger as the price of the latter becomes lower, and no doubt it is used to mix with them at the present time.

In view of the fact that the oil of birch has in part displaced that of wintergreen, Dr. Squibb[1] nearly two years ago made some remarks about the similarity of the three, suggesting that oil of birch should be called by its correct name, and that the Pharmacopœia by its present definition is lending its authority to perpetuate the error. These statements have since called forth from others the recommendation that the artificial oil should be made officinal at the next revision of the Pharmacopœia. How far this would be undesirable may appear on examining the following analysis of a representative sample of the commercial artificial product, and reflecting on the present difference between this and either of the natural oils, and the still greater difference that would naturally follow the recommendation of the artificial methyl salicylate by the Pharmacopœia. If it is not a pure compound now, when it is competing for recognition, what would it degenerate to if it should become established by the recommendation of the Pharmacopœia?

[1] Ephemeris, October, 1887, p. 954.

The sample examined by us had a boiling point of 217° C., and a specific gravity of 1·1833 at 15° C. Immediately on the addition of potassium hydrate the characteristic wintergreen odor disappeared, and a disagreeable phenol-like odor was noticed. Petroleum ether removed nothing from this alkaline solution. On adding chemically pure hydrochloric acid a very bulky precipitate separated. This was collected, pressed, purified and dried as in the case of the acids from the oils, when it was found to be about four times as bulky as they. In weight, however, it was the same. Its melting point was 150° C. Pure salicylic acid melts at 156° C. The powdered acid was heated with petroleum ether and the solution, after removing the first crop of crystals, was allowed to evaporate spontaneously.

The residue from this evaporation was much larger than that obtained from the oils, and, after purification was found to melt at 122° C. or only six-tenths of a degree above benzoic acid. The crystals gave off the characteristic odor of benzoic acid when warmed and when dissolved in hot water, and otherwise corresponded with that acid.

0·1012 gram substance gave 0·2548 CO_2 and 0·0443 H_2O.

Found.		Calculated for Benzoic Acid.	
C, 68·67	per cent.	68·85	per cent.
H, 4·87	"	4·92	"
O, 26·46	"	26·23	"
100·00		100·00	

Vapor Density.—0·062 gram substance displaced 12·5 cc. air.

Found 4·29

Calculated for Benzoic Acid 4·23

Both the combustion and the vapor density determination were repeated without important variation. We made no exact determination of the proportion of benzoic acid present, but it was not far from 15 per cent. of the total acid precipitated. In the acid precipitated from the oils it was not more than 1 per cent. Great loss necessarily occurred in the process of purification.

SUMMARY.

I. Previous investigators have found oil of wintergreen to consist of methyl salicylate and a hydrocarbon, called gaultherilene; and oil of birch to be composed of methyl salicylate alone.

II. We find in addition to methyl salicylate, in both a hydrocarbon of the formula $C_{15}H_{24}$, and small quantities of benzoic acid and ethyl alcohol. The amount of the hydrocarbon is from 0·3 to 0·447 per cent., and it becomes solid on standing a short time or on cooling. It is probably made up of a solid and a liquid portion.

III. The oils are physically and chemically identical. The only difference detected being in the melting point of the hydrocarbons. That from wintergreen melted at from 10° to 15°C., and that from birch at 18°C. This may depend on the time of collecting the plants or on the age of the oils.

IV. A representative sample of artificial oil of wintergreen possessed the physical properties, but not the chemical composition of the natural oils, nor was it pure methyl salicylate.

V. The artificial product, when unmixed with the natural oils, may be identified by the addition of excess of potassium hydrate, when all odor of wintergreen will disappear.

VI. It would be undesirable, in the next Pharmacopœia to replace the almost pure natural oils by an impure methyl salicylate of variable and uncertain composition. No reasonable objection can be offered to the designation by the Pharmacopœia, as oil of wintergreen, the product from either of the natural sources.

FABIANA IMBRICATA.

By George A. Deitz, Jr., Ph. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 58.

Pichi, as this drug is commonly called, was introduced into the United States a few years ago by Parke, Davis & Co., of Detroit. It belongs to the natural order Solanaceæ, sub-order Curvembria, and to the tribe Nicotianeæ. Its habitat is South America, principally Chili. It is said to be especially useful in diseases of the urinary organs, acting as a diuretic as well as a solvent for calcareous deposits.

A full description will be found in the American Journal of Pharmacy, February, 1886, together with a proximate analysis by Dr. A. B. Lyons. The following results do not in all respects agree with those of Dr. Lyons, which may in part be accounted for by my using a sample of the woody portion and bark ground together, which reduced the percentages of extract obtained by the various solvents. It may be here explained that the part used for analysis was

the woody branches, it being claimed that both wood and bark possess medicinal virtues, although it is probable that the latter is the more active of the two.

Petroleum ether dissolved 1·15 per cent. of the drug, which consisted of a trace of volatile oil, a fat melting at 40° C., a wax melting at 45° C., and a caoutchouc-like body soluble in chloroform, insoluble in the other usual solvents and melting at 65° C. No odor of burning rubber, however, was developed when the petroleum ether extract or any of its constituents were ignited, as noticed by Dr. Lyons.

Stronger ether extracted 1·41 per cent. of the drug, and from this ethereal extract warm distilled water dissolved a small percentage of a fluorescent glucoside, which fluorescence was much intensified on the addition of dilute sodium hydrate solution. On agitating this aqueous solution with ether the glucoside was absorbed by the latter solvent, which deposited it in stellate groups of crystals. These crystals were soluble in water, alcohol, chloroform and ether. With concentrated sulphuric acid and potassium bichromate a dark-green color was developed, with nitric or hydrochloric acid a yellow color with some fluorescence, and with potassium or ammonium hydrate a deep yellow with bluish fluorescence.

That portion of the ethereal extract insoluble in water was soluble in absolute alcohol which solution on concentrating and setting aside deposited crystals. These on re-solution and treatment with animal charcoal were obtained of a pure white color. They were entirely insoluble in water, but soluble in boiling 95 per cent. alcohol, absolute alcohol, chloroform and ether. They gave a dark-blue color with sulphuric acid and potassium bichromate, but they were insoluble in and unaffected by concentrated solutions of the alkaline hydrates. They did not melt, but became brown from decomposition at 270° C., the highest temperature to which they were subjected.

Absolute alcohol extracted 1·13 per cent., which was found to consist of an additional quantity of the fluorescent glucoside and resin, but no tannin. The remainder of the drug was found to contain 2·13 per cent. mucilage, 2·04 per cent. albumen and a number of the usual constituents, but only traces of sugar and no starch.

The amount of moisture in the original drug was 7·75 per cent. and the ash 10 per cent.

Finally it may be noticed that no trace of alkaloid was found, although Dr. Lyons thought he detected a small quantity.

Recently an analysis has been made by MM. Niviere and Liotard,[1] who found the fluorescent glucoside, but failed to notice the neutral crystalline compound in the ethereal extract as above described, or to detect any trace of alkaloid. For additional investigation of this neutral principle see the following paper.

ON A CRYSTALLINE COMPOUND IN FABIANA IMBRICATA.

By Henry Trimble and Hermann J. M. Schroeter.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 59.

Both the glucoside and the crystalline compound, rich in carbon, mentioned in the preceding paper, are worthy of further investigation. The present contribution details our results on the latter compound. In this work we were greatly aided by Messrs. Parke, Davis and Co. of Detroit, who sent us a sediment which had separated from 300 pounds of the fluid extract of pichi. This sediment appeared to be largely made up of this compound mixed with woody fibre.

A quantity was dried at 70°C., the residue powdered and macerated with petroleum ether. This solvent removed a small quantity of a wax-like substance. The residue was then extracted with successive portions of stronger ether, which dissolved a large proportion of it. The several ethereal extractions were kept separate, as it was thought there might be more than one compound present and they might be partly separated by this means.

The different lots were purified by recovering the ether, dissolving the residue in hot 95 per cent. alcohol, decolorizing with animal charcoal and recrystallizing from hot alcohol, until pure white, somewhat silky, acicular crystals were obtained. In physical properties the different portions appeared identical. The crystals turned brown at 240° C. and commenced to decompose without melting at 270° C.

A combustion gave the following results. 0·1939 gram substance gave 0·5515 CO_2 and 0·190 H_2O. corresponding to

C,	77·57 per cent.
H,	10·89 "
O,	11·54 "
	100·00

[1] *Jour. de Pharm. et de Chimie*, xvi, p. 389.

Five more combustions were made on the different portions, one being a lot of larger crystals that separated on long standing from a weaker solution. The results were almost identical with the above figures, thus proving the original substance to contain but one crystalline compound. The mean of the six analyses was found to be as follows:—

C, 77·47 per cent.
H, 10·93 "
O, 11·60 "

100·00

No loss occurred on heating the crystals to 110° indicating the absence of water. The compound is apparently a resin of the formula $(C_{18}H_{31}O_2)_x$, and without medicinal value.

It occurs to us that it may be a decomposition product of the fluorescent glucoside in the drug.

POISONOUS PLANTS AND THE SYMPTOMS THEY PRODUCE.[1]

By F. W. Anderson.

When horses, cattle or sheep in Montana, die from unknown causes, which have produced more or less marked cerebral disturbance within a few days or hours before dissolution, accompanied by one or more minor symptoms, they are said to have been "locoed," that is poisoned by some usually mysterious unknown plant. The general symptoms are here given in the order they usually appear:

The animal wanders alone, has unnaturally bright eyes and slight frothing at the mouth or even extreme salivation occurs and the creature goes about with a stream of clear saliva trickling from its chin to the ground, or else the lips are dry, a little swollen and the whole mouth very hot. The appetite becomes notably impaired; large quantities of offensive gas are belched forth frequently accompanied by a greenish froth mixed with finely chewed food. The brain now becomes plainly affected, control of limbs partially or wholly lost—sometimes muscles of one side of the neck are contracted in a pitiable manner. In a few days, hours or minutes as the case may be,

[1] From the *Botanical Gazette*; condensed by G. M. Beringer.

after proper limb-control is lost, the staggering animal refuses to eat or drink at all, becomes stupid, reels and falls, seldom rising again. Stupor increases, eyes become dull and staring, perfect stupor comes on. Limbs and neck may become quite rigid and extended, or else in natural position and easily moved by the hand. Abdomen usually swells to enormous size. Victim may lie in this condition a week or death may come in a few hours, there is rarely any struggle at that time.

Post-mortem examination.—The intestines with their surrounding fat are already green, although the creature may have just died. The arteries and smaller vessels in the limbs are gorged with thick, black blood. The lining of the first stomach is worn and ulcerated in patches and in some cases seems to have commenced decomposition, is very soft and can be peeled off the muscular layer with thumb and forefinger in big pieces. Lungs and heart almost bloodless, but the brain, particularly the cerebellum, is purplish, soft and pulpy.

The symptoms vary considerably and it seems unlikely that one poison causes them all. Four common plants are here said to "loco" stock, viz: Oxytropis Lamberti, Leucocrinum montanum, Fritillaria pudica and Zygadenus elegans. The first is now known to produce no evil effects except when eaten in large quantities for days together. Leucocrinum montanum is said to be very fatal to sheep after the fruit has developed. It grows close in the grass and its narrow grass-like leaves are not easily avoided by stock. Fritillaria pudica is almost the first plant to flower in spring. Before the grass is green horses and sheep often nip off the leaves. The scaly bulb is somewhat acrid to the taste. Zygadenus elegans does not flower so early, but sends up its long grassy leaves at the same time. Sheep eat much of this plant, even nipping off the panicles when they appear. The whole plant is acrid, but the deep-set bulb is strongly so.

NOTE BY ABSTRACTOR.—F. D. Kelsey writing from Montana to the same journal (*Botanical Gazette*, 1889, 20) states that he had recently received specimens of a root and plant from a ranchman, with the declaration that "it was a 'loco' weed and that it was killing horses." The specimen proved to be Oxytropis lagopus, *Nutt.*

The writer of the above article, it will be observed, does not mention any plants of the genus Astragalus, although several species, notably the A. mollissimus, *Torr.*, have been credited with this peculiar toxic action. In fact, the latter plant and the nearly related Oxytropis

Lamberti, *Pursh*, were those to which were originally assigned the name and poisonous properties of loco weeds.

The author adds three new species Leucocrinum, Fritillaria and Zygadenus to the list of loco weeds. We are not surprised that these three liliaceous plants, the last-named being botanically closely related to Veratrum, should have a poisonous action when eaten by cattle, and it seems not unlikely that the eating of these plants by cattle in other localities may have escaped notice. It seems not improbable that this action has been erroneously credited to the milder leguminous plants.

The poisonous character of the plants of the genus Zygadenus has long been recognized. J. U. and C. G. Lloyd, some two years ago, called attention to the extremely poisonous character of Zygadenus Nuttallii, *Gray*[1], stating "that specimens of the plant had been received from Dr. H. S. Goodell who had met with several cases of accidental poisoning therefrom." The Doctor wrote: "I find it to be a powerful narcotic poison. One of my patients, a girl 9 years old, claimed that she only broke a stem of the plant and rubbed the juice over her lips and lapped it off with her tongue. Severe convulsions followed, lasting one and a half hours, the most violent it has been my lot to witness in a practice of 35 years. Twenty-four hours later she had one of an hour's duration." Messrs. Lloyd then stated that "the plant is now being physiologically investigated by Prof. Roberts Bartholow and its constituents are being investigated by us." We believe that no report has yet been published.

In 1879 Sereno Watson, in reviewing "Our North American Liliaceæ," distinguished a new species in what had been classed as Z. Nuttallii, *Gray*. The new species he named Zygadenus venenosus, *Watson*, the specific name signifying its poisonous characters.

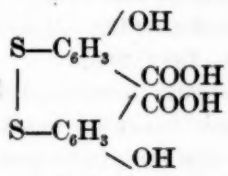
In the "Botany of California" the same writer states of this plant: "The bulb is poisonous and is known among the Northern tribes of Indians as 'Death Camass.' Dr. Bolander states, however, that in Sonoma county it is eagerly eaten by hogs and that hence it is called 'Hog's Potatoes' by the farmers." G. M. B.

Salol is reported by Dr. W. P. Nicholson, of Atlanta, Ga., to have given him very satisfactory results in dysentery and in diarrhœa accompanying typhoid fever; it was used in five-grain doses.—*Virg. Med. Monthly.*

[1] *Amer. Druggist*, Aug., 1889.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Dithio-salicylic acid  is a proposed substitute for salicylic acid; it is made by heating equal molecules of chloride of sulphur and salicylic acid to 120–150° C, dissolving the light-yellow fusion in sodium hydrate and precipitating the acid by addition of HCl as a resinous straw-colored mass forming, after pulverization, a light-yellow powder, easily soluble in alcohol, benzol and glacial acetic acid.—*Oesterr. Ztschr. f. Phar.*, 1889, 298.

Sodium dithio-salicylate is more potent than sodium salicylate, is used in smaller doses and does not produce objectionable symptoms, as disarrangement of the stomach, possibly in consequence of its insolubility. It is used as an antipyretic, antiseptic and disinfectant. *Apoth. Ztg.*, 1889, 679.

Teeth-cleanser for discolored teeth. Make a stiff paste of powdered cuttle-fish bone with a four per cent. solution of hydrogen peroxide; apply by rubbing over the teeth and after a few minutes rinse with plenty water. The teeth are cleansed in a few minutes without injury to the enamel.—*Oesterr. Zeitschr. f. Pharm.*, 1889, 304.

Artificial cloves have been met with in Austria, composed chiefly of wheat flour and ground oak bark, to which, made into a doughy mass, is added a small quantity of ground cloves and then pressed in suitable moulds. The regularity of this artificial product is all-sufficient to detect them if not admixed with genuine cloves; in this case they may be found only on close inspection, but the ridges due to the mould and a yellowish-brown powder found near the ridges will be abundant evidence.—Dr. T. F. Hanausek, *Ztschr. f. Nahrungsm. Unters.*, 1889, 121.

Salol pills are recommended by J. Past to be made by triturating six grams salol with two grams yellow wax until a soft mass is formed which is then stiffened by addition of powdered althæa and magnesia.—*Pharm. Ztg.*, 1889, 384.

Iodine-phenol is prescribed by Rothe as a remedy for whooping-cough as follows: Acid. carbol., spir. vini, aa 1·0; tinct. iodi, gtt. x;

tinct. belladon., 2·0; aq. menth. pip., 50·0; syr. opiat, 10·0. Children from two to twelve years old receive a teaspoonful every two hours, the treatment being continued for one week. This medicine, like antipyrine, shortens the attacks.—(*Wr. Med. Klin. Wochenschr.*)—*Oesterr. Zeitschr. f. Pharm.*, 1889, 285.

A new optical glass, recently introduced in Sweden, is used for making perfectly achromatic lenses having a magnifying power at least 500 diameters greater than those in present use. The glass is made by introducing small quantities of phosphates and borates..—*Apoth. Ztg.*, 1889, 651.

Constituents of some Volatile Oils.—Oil of Laurel-leaves is lævogyre and has sp. gr. 0·924 at 20° C. Only the fractions boiling below 180° were examined and found to be composed of a little *pinene* with considerable *cineol.* The portion boiling above 180° had a decided odor of *anethol.*

Oil of Laurel-berries.—About 50 per cent. boils below 180° and consists of a little *pinene* and much *cineol.* The hydrocarbon *laurene* of Brühl was not found, the peculiar reactions of which described by him were due to admixture of cineol.

Oil of Olibanum.—The crude oil is slightly lævogyre; sp. gr. 0·872 at 20°. Two fractions were obtained by rectification, both lævogyre: I. Boiling-point 157—160°, sp. gr. 0·870 at 20°; II. Boiling-point 160—165°, sp. gr. 0·860 at 20°. *Pinene* was found and its identity with *olibene* established. By treatment with bromine, a fraction, boiling at 177—179°, gave a considerable quantity of dipentene tetrabromide, proving the presence of *dipentene* in this oil.

Oil of Elemi is dextrogyre, has sp. gr. 0·900. The fractions below 175° contain *dextro-phellandrene*, a hydrocarbon also found in the oils of bitter fennel and Phellandrium aquaticum. *Dipentene* is present and, in addition, polyterpenes and oxygenated products. In the rectification small crystals were repeatedly observed which were assumed to be *amyrin.*

Oil of Sage: Dextrogyre, sp. gr. 0·917 at 20°; the first fractions contain *pinene* and *cineol;* the greater portion boils at 201—204°, is called *salviol* and will be further studied.

Oil of Mace.—Considerable distils at the temperature of 165°; the distillate has sp. gr. 0·854 at 20° and is composed chiefly of *pinene*, although slightly lævogyre. The crude oil, as also the higher boiling fractions, are strongly dextro-rotary, and further investigation will be

made to ascertain the nature of the dextro-rotary constituent. Dipentene was observed in the fraction boiling between 175° and 180°. —O. Wallach (*Liebig's Ann.*), *Apoth. Ztg.*, 1889, 690.

Polydissolvant or sulpholeinic acid is prepared by action of sulphuric acid upon vegetable oils and made neutral in reaction by repeatedly washing with salt solution and with ether. It combines with a great number of substances which then are completely soluble in water or form emulsions with water as ether, chloroform, benzin, oil of turpentine, etc.; by warming or boiling with this acid, sulphur, iodoform, camphor, naphthalin and various coloring principles are dissolved. These solutions are quite penetrating and are easily absorbed by the skin making this vehicle superior to vaselin, oleic acid, glycerin and similar substances for external use.—*Apoth. Ztg.*, 1889, 690.

Mineral oil in fixed oils is tested for by Dr. Holde, by taking a piece of potassium hydrate of the size of a pea and boiling in a test tube with 5 cc. alcohol until solution is effected, adding 3 or 4 drops of the oil to be tested, boiling for a minute and adding from 3 to 4 cc. water; if as little as one per cent. mineral oil is present a distinct turbidity is produced, larger quantities cause the turbidity to take place after the addition of only a few drops of water.—*Apoth. Ztg.*, 1889, 751.

Oil of Bay, studied by Otto Mittmann, contains the following constituents: 1, *Pinene*; 2, possibly *dipentene*; 3, a polyterpene, probably *diterpene* (insoluble in alcohol); these three in small quantity only; 4, *eugenol*, the chief constituent, and 5, *methyl eugenol* in smaller quantity.—*Arch. der Pharm.*, 1889, 529.

Senega root, test for identification and age. This test is based upon the fresh root containing a small quantity of methyl salicylate, which by long keeping volatilizes. 5 gm. of the air-dried root, cut into small pieces, are macerated with agitation, with 30 gm. ether for one-half to one hour; the ethereal solution is filtered into a small beaker which contains about 20 cc. water at 40-50° C.; after the evaporation of the ether, hastened by slight warming, an oleo-resinous mass will float upon the surface of the water, while the salicylic acid will be in solution; without previous filtration, one dop of a ferric chloride solution is added which should produce at once a deep violet color.—Ludwig Reuter, *Arch. der Pharm.*, 1889, 549.

Fowler's solution.—G. Kassner has, in the course of some investigations, noticed that an alkaline solution of arsenous acid tested, by

volumetric solution of iodine, from time to time, showed deterioration; this he accounted for by assuming atmospheric oxidation (change of arsenite into arsenate) and by experiment proved that the full amount of arsenic was present but for the above method of estimation required previous reduction of the arsenate to arsenite by use of sulphurous acid. A carefully titrated one per cent. solution kept for eight weeks indicated 0·96 per cent. but by previous reduction with sulphurous acid the full per centage was again found. Kassner thinks this oxidation accelerated by an excess of alkali.—*Pharm. Ztg.*, 1889, 549.

Improved Test for Arsenic.—Increased delicacy of Gutzeit's test (AMER. JOUR. OF PHAR., 1889, 133) is obtained by E. Ritsert through the use of filtering paper moistened with an *ammoniacal solution of silver nitrate;* 0·0005 mgm. As_2O_3 still gives a light brown, while 0·001 mgm. As_2O_3 will cause a decided black stain. By using parchment paper instead of filtering paper metallic mirrors are obtainable. Besides greater delicacy this modification has the advantage that ammoniacal silver nitrate is not so easily decomposed by paper.—*Pharm. Ztg.*, 1889, 368.

Oil of lycopodium has been examined by A. Bukowsky who, receiving results differing materially from those gotten by A. Langer (AMER. JOUR. OF PHAR., 1888, 455), attributes this to the latter working with some very old lycopodium in which the oil had become rancid. Personally gathered spores were extracted, after trituration, with ether; the yield was 48·50 per cent. of an odorless oil resembling almond oil in color and consistency; sp. gr. 0·925 at 18°; does not solidify at —22°; is optically inactive; is non-drying; easily soluble in ether, *glacial acetic acid, petroleum ether,* chloroform, oil of turpentine, benzol and hot alcohol, difficultly soluble in cold alcohol and in amyl alcohol. Contains the following constituents in approximate quantities: *Phytosterin,* $C_{25}H_{42}O$, 0·3 per cent.; *lycopodic acid,* $C_{18}H_{36}O_4$, 2 per cent., this acid is isomeric but not identical with dioxystearic acid, melts at 90—92° C., solidifies at 87—84°, forms a lead salt insoluble in ether but rendered soluble by the presence of oleate of lead; *oleic acid,* 80 per cent.; *arachidic, stearic and palmitic acids,* 3 per cent.; glycerin, 8·2 per cent.—*Pharm. Ztschr. f. Russl.*, 1889, 359.

Ferrum dialysatum is obtained by dialysis of such dilution that it requires concentration to be of use in medicine; Hager concentrates by evaporation at a temperature not exceeding 60° to prevent the coagulation of ferric hydrate. Kranzfeld attempted to make this

preparation by using very concentrated solutions of ferric chloride and ammonia, but here also the finished product was too dilute. Working during the cold weather, the idea of concentrating the solution by freezing suggested itself and was practically carried out by exposing the weak dialyzed preparation over night in funnels closed with corks or rubber tubing with clamp. The next morning the fluid portion was allowed to drain off from the ice and the process repeated until of the desired strength. It was noticed that every freezing raised the amount of ferric hydrate one per cent. A 5 per cent. solution should have the sp. gr. 1·046.—*Pharm. Ztschr. f. Russl.*, 1889, 373.

Collodium can be obtained perfectly transparent if it be agitated with carefully washed and ignited quarz sand; the effect is purely mechanical, the suspended particles with the sand forming a heavy gelatinous mass from which the clear collodium is easily decanted.—Kranzfeld, *Pharm. Ztschr. f. Russl.*, 1889, 392.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

A New Topical Preparation of Iodine.—M. Eymonnet uses paper free from size which he saturates with iodide of potassium, and another paper similarly treated with iodate of potassium and tartaric acid. These papers, separated by a very thin sheet of plain paper, are then brought together with gutta-percha fasteners and enclosed in a thin sheet of gutta-percha. Plasters thus made will keep indefinitely and the iodine does not appear until the paper is immersed in water. On application, iodine is disengaged from the paper during about forty-five minutes. The amount disengaged is about thirty cgm. for each leaf. The author states that an application of these leaves for forty or fifty minutes produces better effects than can be had by five or six hours application of iodized cotton, or five or six paintings with the tincture. The plasters do not burn the skin and are tolerated for from half an hour to an hour. When necessary they may be covered with gutta-percha, and the clothing thus be protected.—*Bull. du Synd. de la Côte-d'Or; L'Union Phar.*, June.

Concerning Some New Plasters.—M. Cavailles writes (*J. de Ph. et Ch.; L'Union Phar.*, May 15): Plasters containing anthrarobin,

chrysarobin and pyrogallic acid cannot well be made with a basis of lead. He obtains good preparations with oleate of alumina for such plasters as are not intended to irritate, as, for instance, those of oxide of zinc, boracic acid, etc. For salicylic acid, creasote, pyrogallic acid, chrysarobin, anthrarobin, etc., a solution of caoutchouc in benzol is used. For example: Lanolin, 60 gm.; benzinic solution of caoutchouc, 30 gm.; anthrarobin, 10 gm. Pulverize the anthrarobin well and incorporate it with the lanolin; melt with gentle heat, add the benzinic solution and agitate until complete evaporation of the benzol. The formula is suitable for other plasters.

To Dissolve Naphthol.—For concentrated solutions, or topical mixtures, alcohol is used. For washes or gargles the above may be mixed with honey fully liquified by heat. These, if the honey is free from water, remain limpid for two or three days. Diluted solutions are not so easily made, for, apart from alcohol, only alkalies or alkaline salts can be used, and these, combining with the naphthol, produce comparatively weak antiseptic solutions. The benzoate of soda is useless here. The alcoholic solution may, for some purposes, be diluted with soap and water; but the best method seems to be to first dissolve the naphthol in camphorated alcohol. Camphor liquifies dry naphthol, and it retains the property to some degree in mixtures of water with camphorated alcohol. But, although naphthol in camphorated alcohol mixes more easily with water than does the pure alcoholic preparation, it does not form, strictly speaking, a solution.—*Répert. de Phar.*, June 10.

Enemata of Hypnone, Chloral and Sulphonal.—M. P. Vigier recommends a formula as follows: Hypnone, 10 to 20 drops; powdered gum, 3 gm.; oil of sweet almonds, 5 gm.; water, 150 gm.; for one enema. Mix the oil and gum in a mortar, add the water, and introduce the hypnone a little at a time while beating. Emulsion is perfectly effected in five minutes. The hypnone may be replaced by 1 or 2 gm. of chloral or of sulphonal.—*L'Union Phar.*, May.

Ural—This new hypnotic is obtained by dissolving urethan in chloral. It appears in the form of crystals, soluble in alcohol, sparingly so in water and fusing at 106° C. [222·8° F.] It has a bitter taste and volatilizes without decomposing. According to Puppi, ural is the most rapid and certain of all known hypnotics. It gives rise to no modification of blood pressure. No accidents have resulted

from its use. Thus far it has been prescribed with apparent success in cardiac affections, mental maladies and hysteria.—*Revista med.; Nouv. Rem.*, May 24.

MIXTURE OF EXALGIN.—According to M. H. Jouisse (*Nouv. Rem.*, July 8) an agreeable and unalterable preparation of exalgin may be made as follows: Exalgin, 2 gm.; tr. aurant. cort., 5 gm.; syr. aurant. flor., 30 gm.; aq. dest., 120 gm. The exalgin should be dissolved in the tincture and the syrup added; afterwards the water. A tablespoonful contains 20 cgm. of exalgin.

DIFFERENTIAL CHARACTERS OF STRYCHNINE AND EXALGIN.—A few practical points are thus presented by M. H. Jouisse, *Nouv. Rem.*, July 8: EXALGIN (ortho-methylacetanilid)—an odor of raspberry, increasing with heat; no bitter taste; causes anæsthesia on the point of the tongue; on trituration the raspberry odor is disengaged; a solution of tannic acid added to a solution of exalgin gives no precipitate. STRYCHNINE—a slight ethereal odor; bitter taste without anæsthesia; trituration gives an odor as of scorched bread; tannic acid solutions give flocculent precipitate; with permanganate of potash (the mixture being treated with sulphuric acid) strychnine gives an orange color, turning to a brick red. Exalgin gives a brown color which so remains, although it gets gradually paler. The writer presents these reactions in the fear that strychnine and exalgin may be mistaken for each other on account of the close resemblance of their crystallized preparations.

SUGAR OF MILK AS A DIURETIC.—In a communication to the *Académie de Médecine* Prof. Germain Sée reports his researches concerning lactose, which he describes as the substance to which milk owes its power as a diuretic. He found that potions containing 100 gm. of lactose "produced an enormous diuresis such as cannot certainly be obtained with 4 or 5 liters of milk." He thought that in milk the action of lactose is obstructed by the presence of casein and fat. In cardiac cases, with dyspnœa, the lactose should be combined with iodide of potassium.—*Nouv. Rem.*, June 24.

ODORLESS VALERIAN.—M. Jouillard lately examined some of Meglin's pills, which, though composed of extract of valerian, were free from the characteristic odor of that drug. He learned that the pills had been made from an extract prepared *in vacuo*. The removal of air pressure had caused the aromatic principle to volatilize.—*S. de Ph. de Paris; Répert. de Phar.*, June 10.

SOME SUGGESTIONS FOR THE USE OF LANOLIN IN PHARMACY.

By A. Ball.

Lanolin, the purified fat of sheep's wool, discovered for use commercially by Liebreich, is now so well known that little need be said about its composition. Its consistence is somewhat elastic and sticky, and in order to make it more pliable it is necessary to dilute it with a substance which will not detract from its penetrating power. What is to be used? is frequently asked in dispensing. The fact that lanolin will take up twice its own weight of an alkaline solution should not be lost sight of. In the preparation of ung. potassii iodidi B. P. with lard, it is first necessary to saponify the lard with potassii carbonas, when the soap will take up the iodide, which is subsequently decomposed again by the soap, iodine being set free, as indicated by the decoloration. With lanolin the case is different, as the solution is perfectly absorbed by the fat. I recently made some experiments with the ointment, prepared with three different bases. No. 1 with equal parts lard and lanolin. No. 2 with equal parts vaselin and lanolin. No. 3 lanolin with 30 per cent. added distilled water.

These ointments were severally spread on pieces of membrane, previously tested as to permeability by dialysing 1 oz. of cochineal solution. After standing twelve hours on the septum no difference in color could be discerned; the membranes were then washed, and the ointments evenly spread over the surface, to within an inch of the outside. After dialysing for twenty-four hours at 50° F, No. 3 only gave the iodine reaction. I then kept them in a temperature of 80° F. for twenty-four hours, when I found No. 3 gave a copious precipitate, No. 2 less, and No. 1 still less, when tested with nitrate of silver solution, showing that most iodide had passed through the membrane in the case of the lanolin base. Fat had also passed through in each case. I reasoned that if the ointment would pass through a dead membrane it would most certainly pass through a living one, osmosis being the same in each case. Osmotic action has doubtless to perform a most important part in the absorption of medicinal agents when applied as ointments.

Oleates are especially adapted for mixing with lanolin. Dr. Shoemaker very clearly proved the peculiar penetrating properties of the

oleic acid preparations, when applied as ointments or dusting powders. Whilst paraffin ointments prevent penetration of the cuticle by forming a superficial varnish on the skin, lanolin assists the osmotic action. For instance, an ointment of oleate of cocaine and lanolin, applied along the course of the nerve in facial neuralgia, quickly relieves the pain, and causes local anæsthesia. Then there is another important point in favor of lanolin, as an excipient in making suppositories of potass. bromid., ext. belladonnæ, acid. carbolici, etc., or any other substance soluble in an equal quantity of water.

The anhydrous lanolin stiffened with cocoanut butter or stearin will make a perfect suppository. First dissolve the medicament; work up with the lanolin and add to the melted cocoa-butter or stearin, and pour into moulds. The suppository is readily melted at body heat; being elastic it is not easily broken, and it is more readily retained in the rectum and quickly absorbed by the membranes. Lanolin may also be used for making "hair cream." If hot water is gradually added to the lanolin in a warm mortar, stirring all the time, any consistency of cream may be obtained. When nicely scented with rosemary oil and otto, with which cantharidin solution (1 gr. in 1 drachm s.v.r., sufficient for Oj.) has been mixed carefully, the preparation will keep well, and render the hair smooth and glossy, besides being less expensive than a mixture of oils.

In conclusion, I would beg to draw attention to the fact, that solutions of salts hitherto non-miscible with lard and paraffin may be easily and perfectly incorporated with lanolin; for instance, solution of potassium permanganate is not reduced. As the lanolin keeps perfectly a long time, no fear of finding the stock of an ointment rancid need ever be entertained.—*Phar. Jour. and Trans.*, May 25, 1889.

WALNUT OIL.

By Thomas T. P. Bruce Warren.

This oil, which I obtained from the fully ripened nut of the *Juglans regia*, has so many excellent properties especially for mixing with artists' colors for fine art work, that I am surprised at the small amount of information available on this interesting oil.

Walnut oil is largely used for adulterating olive oil, and to compensate for its high iodine absorption it is mixed with pure lard oil olein, which also retards the thickening effect due to oxidation. The

marc left on expression of the oil is said to be largely used in the manufacture of chocolate. Many people, I am told, prefer walnut oil to olive oil for cooking purposes.

The value of this oil for out-door work has been given me by a friend who used it for painting the verandas and jalousies of his house (near Como, Italy) some twenty years ago, and which have not required painting since. In this country at least, walnut oil is beyond the reach of the general painter, and I do not know that the pure oil is to be obtained as a commercial article, even on a small scale.

It was in examining the properties of this and other oils, used as adulterants of olive oil, that I was obliged to prepare them so as to be sure of getting them in a reliable condition as regards purity. The walnuts were harvested in the autumn of 1887, and kept in a dry airy room until the following March. The kernels had shrunk and contracted a disagreeable acrid taste, so familiar with old olive oil, in which this has been used as an adulterant. Most oxidized oils, especially cotton-seed oil, reveal a similar acrid taste, but walnut oil has, in addition, an unmistakable increase in viscosity. The nuts were opened and the kernels thrown into warm water, so as to loosen the epidermis; they were then rubbed in a coarse towel, so as to blanch them. The decorticated nuts were wiped dry and rubbed to a smooth paste in a marble mortar. The paste was first digested in CS_2, then placed in a percolator and exhausted with the same solvent, which was evaporated off. The yield of oil was small, but probably, if the nuts had been left to fully ripen on the trees without knocking them off the yield might have been greater. It is by no means improbable that oxidation may have rendered a portion of the oil insoluble. The decorticated kernels gave a perfectly sweet, inodorous, and almost colorless oil, which rapidly thickens to an almost colorless, transparent, and perfectly elastic skin or film, which does not darken or crack easily by age. These are properties which for fine art painting, might be of great value in preserving the tinctorial purity and freshness of pigments.

Sulphur chloride gives a perfectly white product with the fresh oil, but, when oxidized, the product is very dark, almost black. The iodine absorption of the fresh oil thus obtained is very high, but falls rapidly by oxidation or blowing. A curious fact has been disclosed with reference to the oxidation of this and similar oils. If such an oil be mixed with lard oil, olive oil, or sperm oil, it thickens by oxida-

tion, but is perfectly soluble. Such a mixture is largely used in weaving or spinning. Commercial samples of linseed oil, when cold drawn, have a much higher iodine absorption, probably due to the same cause. Oils extracted by CS_2 are very much higher than the same oils, especially if hot pressed.—*Chem News*, June 14, p. 279.

KERATIN AND KERATINIZED PILLS.[1]

By E. Bourquelot.

Under the name "keratin" are designated certain products obtained by exhausting different horny tissues, such as bristles, nails, horn, feathers and epidermal tissue, successively with ether, alcohol, water and dilute acids. Although these present among themselves, according to their origin, differences of composition, they may be classed under the same designation by reason of the chemical and physical properties they possess in common. In the dry state they are all very hygroscopic, but nevertheless they do not swell much in water. If they are subjected under pressure to the action of water at 150° C. they are decomposed, sulphuretted hydrogen being given off.

Keratin swells in cold and dissolves in hot concentrated acetic acid. When boiled in dilute sulphuric acid it is decomposed, yielding leucine, tyrosine and asparagic acid. Keratin swells in alkalies and dissolves in them when heated, and if an acid be added to an alkaline solution sulphuretted hydrogen is evolved.

The centesimal composition of the products designated as keratin, so far as they have been studied up to the present, varies within the following limits: C, 50·3–52·5; H, 6·4–7; N, 16·2–17·7; O, 20·7–25; S, 0·7–5. It would appear from their composition that these products are intimately related to the albumenoid substances.

Keratin has been employed and recommended by Unna and Beiersdorf for the making of "keratinized pills" or "pills for the small intestine." Pills coated with a layer of keratin, which is insoluble in the gastric juice, are not dissolved until they reach the intestines, when they come under the action of the alkaline bile which dissolves the keratin.

The medicines which may advantageously be administered un-

[1] *Journal de Pharmacie et de Chimie;* reprinted from *Phar. Jour. and Trans.*, June 22, p. 1035.

der this form are rather numerous. Among them may be mentioned:

(1) Medicines that can by prolonged contact cause irritation to the mucous membrane of the stomach: arsenic, salicylic acid, creasote, chrysarobin, quinine compounds, copaiba balsam, cubebs, ferruginous preparations and especially perchloride of iron, opium, mercurial preparations and especially biniodide and bichloride of mercury, phosphorus and all the tænifuge preparations.

(2) Medicines that can injure the digestion by giving insoluble precipitates with pepsin and peptones: tannin, alum, acetate of lead, preparations of bismuth, nitrate of silver, corrosive sublimate, etc.

(3) Medicines that are rendered inactive or decomposed by the gastric juice: alkali, bile, soap, sulphide of calcium, sulphide of iron, pancreatin, etc.

(4) Medicines which should arrive in the intestines as concentrated as possible: kousso, santonin, extract of male fern, alkali.

For the preparation of a solution of keratin suitable for the coating of pills several formulæ have been proposed, in all of which either acetic acid or ammonia figures as a solvent. As, however, certain medicines are modified or decomposed by one or other of these substances, a choice of formula should be made according to circumstances. For instance, the acetic solution might be used for coating pills containing salts of mercury, gold or iron, arsenic, creasote, salicylic acid, tannin, alum, etc. On the other hand, an ammoniacal solution might be had recourse to for pills containing pancreatin, trypsin, bile, alkalies, sulphide of iron, etc. For certain other substances, such as naphthaline, it is immaterial which of the solutions is used.

Keratin is prepared by Unna by steeping parings of horn in a digestive liquid composed of pepsin, 1 gram, hydrochloric acid, 1 gram, and water, 11 grams, as long as the shavings yield anything to the solvent. The residue is then dissolved in ammonia by maceration lasting several weeks, after which the solution is evaporated.

Gissmann boils the quills of birds' feathers in glacial acetic acid for twenty-four to thirty-six hours in a retort furnished with a return condenser. A thick yellow-brown liquid is thus obtained, which is filtered through glass wool, evaporated on a water-bath to the consistence of an extract and afterwards dried.

Dieterich employs Gissmann's process, but before the treatment with

acetic acid he subjects the feathers to ten hours' digestion in water and then to eight days' maceration in a mixture of equal weights of ether and alcohol, to eliminate fatty matters and cholesterin.

Keratin obtained by one of the foregoing processes is dissolved with the aid of a gentle heat either in acetic acid or ammonia and the solution is allowed to clear by standing. Fischer recommends the employment of seven parts of keratin with either 100 parts of acetic acid or a mixture of equal parts of ammonia and dilute alcohol.

If the pill mass should contain water, the pills would shrink and fissures would be produced in the keratin coating. It is, therefore, recommended to use in the making of these pills a mixture of yellow wax, 1 part, and suet or cacao butter, 10 parts. It is also necessary to avoid the use of vegetable powders and to employ in their place kaolin or charcoal powder.

When the pills are finished they should be dipped in cacao butter, rolled in charcoal powder and then keratinized. For this purpose the pills, placed in a porcelain capsule, are sprinkled with a suitable quantity of keratin solution and then shaken together until the evaporation of the solvent takes place. This moistening and drying requires to be repeated several times (as many as ten) before the layer of keratin is sufficiently thick.

The process employed for coating pills with gelatin, which consists in dipping into the solution the pill fixed on the point of a needle, is not suitable here, for it leaves a hole through the keratin coating that can never be completely closed.

In order to ensure that the keratin used is insoluble in the stomach, Unna recommends that a preliminary experiment should be made with sulphide of calcium pills coated with it. If in the course of some hours after such pills are taken eructations of sulphuretted hydrogen are observed, it would indicate that the pills have been dissolved in the stomach. When the keratin is of good quality nothing of the kind should occur. Finally, to complete the test, the pills when placed in water should not liquefy or crack.

Iodide of starch as a disinfectant in gastric disturbances is recommended by Dr. Yerseienko in doses of 0·1 to 0·3 for children, and 0·5 gm. for adults. It may be given in the form of powder or pill, and may be combined with Dover's powder.—*Dtsch. Med. Woch.*

NOTE ON THE DILUTION OF COW'S MILK IN INFANT FEEDING.

By Geo. Smith, F. C. S.

The following may be of interest as having a bearing on Dr. Rotch's article on this subject published in the *Pharm. Jour.* for March 2, page 706. The writer, in September, 1886, had occasion to consider this question in his daughter's case, owing to the mother's deficiency in milk. The food used as a substitute on that occasion has proved so successful in more than one case that it merits recording.

The formula is mainly based on a process devised by Professor Frankland in rearing one of his own children (*vide* "Experimental Researches," pp. 843, 844).

In his paper (published December, 1854) Prof. Frankland gives the percentage amounts of the different constituents of human, ass's, and cow's milk as follows :—

	Woman.	Ass.	Cow.
Casein	2·7	1·7	4·2
Butter	3·5	1·3	3·8
Milk-sugar	5·0	4·5	3·8
Salts	·2	·5	·7

These figures for human and cow's milk differ in several respects from the averages deduced from a wider range of analyses which are quoted by Mr. Thos. Maben in a paper published in the *Pharm. Jour.* for March 23 (pp. 768–769), the most notable differences being those of sugar and fat; but on referring to the *minimum* and *maximum* figures found by Prof. Leeds,[1] from analyses of 80 samples of human milk from different sources, it will be seen that those given by Professor Frankland provide him with a basis for a formula which produces a fair imitation of human milk from that of the cow.

In this formula Professor Frankland takes no account of the differences in *coagulable* and *non-coagulable* albuminoids existing in each of the respective milks. His process practically consists in a precipitation (by means of rennet) of one-third of the casein from fresh cow's milk, and the addition of one-third more milk-sugar, but this was found by the writer somewhat tedious except to a specially trained person. The process of dilution with water was adopted because it was simpler and would enable the food to be prepared in a few minutes whenever it was required.

[1] *Pharm. Jour.*, [3], xv., p. 580.

Taking Professor Frankland's figures for the average of fresh cow's milk, as quoted, it will be seen that when it is diluted with water in the proportion of 3 parts of the former to 2 parts of the latter the average amount of constituents is modified as follows:

Fresh cow's milk 3 parts, water 2 parts—

Casein	2·52 per cent.
Fat	2·28 "
Sugar	2·28 "
Ash	·42 "

From these figures the writer compiled the following formula.

The albumenoids, fat, and milk-sugar are by calculation made to approximate as nearly as possible to the average of these constituents in human milk.

Finely ground oatmeal	½ gradually increasing to ½ oz.
Fresh butter	1 drachm.
Milk-sugar	2 drachms.
Fresh cow's milk	6 fluid ounces.
Pure water	4 fluid ounces.
Salt	5 grains, or a sufficiency.

Mix gradually the water with the oatmeal, milk-sugar, and salt, so that no lumps are formed in the mixture, then add the milk and butter, and heat to the boiling point in a clean, enamelled saucepan. The product should be made up to the measure of half a pint, if necessary, and given lukewarm with a spoon when required.

The oatmeal was introduced as a useful attenuant, and it has been found to act as a laxative, and also as a direct fat and heat-producer in the process of digestion. The process of feeding with a spoon is at first troublesome, but it is to be preferred to the use of a feeding bottle, as, if care be taken to have all the vessels employed scrupulously clean, the infant will enjoy an immunity from thrush (*Oidium albicans*), diarrhœa, and other diseases that follow in their train.—*Phar. Jour. and Trans.*, July 6, p. 3.

OXIDATION OF MILK-SUGAR.[1]

By E. Fischer and J. Meyer.

Lactobionic acid, $C_{12}H_{22}O_{12}$, is obtained when milk-sugar (1 part) dissolved in water (7 parts) is treated with bromine (1 part) at the ordinary temperature, the mixture being frequently shaken. The bromine dissolves in the course of one to two days and, after keeping

for another 48 hours, a stream of air is passed through the solution to drive off most of the free bromine, the remainder being converted into hydrobromic acid by passing hydrogen sulphide into the cooled solution. The quantity of hydrobromic acid present having been ascertained by titrating a portion of the solution with silver nitrate, the calculated quantity of lead carbonate is added, and the hydrobromic acid remaining in the filtered solution is carefully precipitated with silver oxide. The solution is filtered, treated with hydrogen sulphide, and the filtrate evaporated. The acid, syrupy liquid thus obtained is agitated for a long time with large quantities of cold glacial acetic acid to remove reducing substances and other products, the colorless residue, the weight of which is about one-third that of the lactose employed, is dissolved in water and the warm solution precipitated with a hot, concentrated solution of basic lead acetate. The solution of basic lead acetate is prepared by dissolving the neutral salt (2 parts) and lead hydroxide (1 part) in hot water (3 parts) and dissolving the crystals, which separate on cooling, in pure, hot water. The precipitated lead salt is quickly separated by filtration, washed with hot water, and then suspended in cold water and decomposed with hydrogen sulphide. The filtrate is evaporated on a water-bath in a partial vacuum, the residue treated with alcohol and ether to remove acetic acid, and finally dissolved in a small quantity of water and reprecipitated with alcohol and ether.

Lactobionic acid is a colorless, strongly acid syrup, and is very readily soluble in water, but only very sparingly in alcohol and glacial acetic acid, and is insoluble in ether. It decomposes carbonates, but does not reduce Fehling's solution even on boiling. The *calcium*, $(C_{12}H_{21}O_{12})_2Ca$, *barium*, $(C_{12}H_{21}O_{12})_2Ba$, *cadmium*, and *lead* salts were prepared by warming an aqueous solution of the acid with the corresponding carbonate; they are all insoluble in alcohol, but readily soluble in water excepting the basic lead salt. On evaporating the aqueous solution over sulphuric acid, the salts are obtained in the form of syrups which gradually solidify but do not clearly show a crystalline structure.

Lactobionic acid is decomposed into galactose and gluconic acid when warmed with dilute mineral acids. The pure acid was heated at 100° for an hour with 5 per cent. sulphuric acid; the gluconic acid was then isolated by means of the barium salt, and identified by

[1] *Berichte*, xxii., 361—364; *Jour. Chem. Soc.*, May, 1889.

converting it into the calcium salt (Kiliani, *Annalen*, ccv, 184). The filtrate was evaporated, and the galactose, which crystallized from the solution, identified by converting into the osazone.

The formation and decomposition of lactobionic acid confirm Fischer's conclusions, (1888,) with regard to the constitution of milk-sugar.

An acid, isomeric with lactobionic acid, can most probably be obtained from maltose by the process described above; this compound, on inverting, should yield gluconic acid and dextrose.

THE COMPOSITION OF TRAGACANTH.

By John Ogle, M. P. S.

An article headed "The Soluble Gum of Tragacanth," by Professor J. M. Maisch, reprinted from the *American Journal of Pharmacy*, suggested that some uncertainty exists as to the composition of this drug. The statements made in the various works on materia medica referred to in that article are so conflicting that it was felt that another investigation would not be out of place. Accordingly an examination was carried out with the object of determining the amount of moisture and soluble gum present; to what extent the soluble portion resembles gum acacia; and the percentage of ash yielded.

A sample of fine Syrian tragacanth, answering to the "characters" of the Pharmacopœia, was obtained through the courtesy of Mr. C. Umney. Of this, 5 grams, maintained at a temperature of 100° C. for twenty-four hours, left a residue weighing 4·054 grams, the loss of ·946 gram being equivalent to 18·92 per cent. of moisture.

The dried gum was powdered: to 3 grams of the powder 250 cc. of distilled water were added, and the mixture was heated to 80° C. for six hours, in order to effect disintegration. To the resulting semi-fluid mass, which was too viscid to allow of filtration, distilled water was added so as to increase the volume to a litre. After standing for two hours the fluid was thrown upon a wet filter, when a bright, colorless solution, neutral to test paper, was slowly obtained. 100 cc. of this liquid, representing the soluble constituents of ·3 gram of the dried sample, yielded on evaporation a transparent residue which weighed ·133 gram, equal to 44·33 per cent. of soluble gum calculated

for the dried, or 35·94 per cent. for the natural tragacanth. This residue having been ignited left an ash, which, on examination, was found to consist chiefly of calcium and potassium phosphates.

The filtrate answered to the tests given under gum acacia in the Pharmacopœia, the precipitate resulting from the addition of rectified spirit rising to the surface as a transparent gelatinous mass; subacetate of lead produced a white opaque jelly. On the other hand, it differed from arabin in giving a clear solution with borax, and in the absence of precipitates when treated with sodium stannate and sodium silicate; also, by the production of a white precipitate in the presence of neutral lead acetate. After boiling with hydrochloric acid it readily reduced Fehling's solution. Both the soluble and insoluble portions yielded mucic acid when heated with strong nitric acid. The water-insoluble gum readily dissolved in potassium hydrate, whereas lime water appeared to have little or no solvent action.

Two grams of the tragacanth left on ignition ·055 gram of ash, equal to 2·75 per cent. which was partly soluble in water, the dissolved material consisting mainly of the phosphates of sodium and potassium, the insoluble portion containing calcium carbonate, with traces of magnesium salts.

These then are the tabulated percentage results obtained :—

Moisture	18·02
Soluble gum	35·94
Ash	2·75
Insoluble gum (by difference)	42·39
	100·00

No evidence of the presence of starch could be obtained, the iodine test producing no coloration,[1] nor could the official statement that " after maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit " be verified. In fact, as stated above, alcohol at once gave an evident precipitate.—*Phar. Jour. and Trans.*, July 6, p. 3.

Creosote and Codliver Oil have been combined in phthisical and chronic catarrhal affections and were usually prescribed Creasote 2·5; Codliver Oil 200; Saccharin 0·1; adult dose a tablespoonful.—*Therap. Monatsh.*

[1] We have examined many samples of flake tragacanth of various grades, and invariably found starch present; we know of no other author having found tragacanth free from starch —Editor *Am. Jour. Phar.*

SOLUBLE PRUSSIAN BLUE.[1]

By C. E. Guignet.

Ordinary soluble Prussian blue is a compound of Prussian blue with potassium ferrocyanide. It is easily obtained by gradually adding to a boiling solution of 110 grams of potassium ferricyanide a hot solution of 70 parts of crystallized ferrous sulphate. The mixture is boiled for two hours, filtered, and the precipitate washed until the washings become dark blue. It is then dried at 100°, and has a fine deep-blue tint, and is very soluble in water. Admixed potassium ferrocyanide can be removed by washing with alcohol of 40 per cent. The compound is precipitated from its solution by sodium sulphate, sodium chloride, etc., but when the salts are removed by washing it redissolves. With salts of lead, zinc, and other metals, it yields, as Wyrouboff observed, a series of well-defined blue compounds.

Colloidal Prussian blue was obtained by Graham by dialysis. Pure soluble Prussian blue is obtained by suspending purified Prussian blue in a saturated solution of oxalic acid, filtering, and allowing the mixture to remain for two months. Prussian blue is completely precipitated, and the liquid is quite colorless. After thorough washing with dilute alcohol, the precipitate is readily soluble in pure water. The same result is obtained in a very short time by precipitating the oxalic acid solution with strong alcohol or by a concentrated solution of sodium sulphate, and washing the precipitate with dilute alcohol. Ammonium oxalate or tartrate can be used instead of oxalic acid.

If the oxalic acid solution is boiled, insoluble Prussian blue is precipitated, a result due to the action of the acid and not to the rise of temperature. Dilute sulphuric acid has the same effect at the ordinary temperature, and the precipitate does not dissolve even after long washing. The soluble and insoluble modifications have the same composition.

When Prussian blue is heated with water and molybdic anhydride, it yields a deep-blue solution which is not affected by boiling or by gelatin. It is precipitated by sulphuric or nitric acid, but if the precipitate, which retains a small quantity of molybdic anhydride, is well washed with dilute alcohol, it dissolves in pure water. Ammonium molybdate and tungstate will also dissolve Prussian blue.

When Prussian blue is treated with concentrated sulphuric acid, it yields a soft, white mass like starch-paste, and if the temperature

[1] *Compt. rend.*, cviii, 178—181; from *Journ. Chem. Soc.*, May, 1889.

rises is partially decomposed. Hydroferrocyanic acid is liberated and partially dissolves in the excess of sulphuric acid. If the liquid is filtered through glass-wool and the filtrate cooled, it deposits the acid in long needles. The same result is obtained with lead or copper ferrocyanide.

If Prussian blue which has been treated with sulphuric acid, is treated with absolute alcohol, it re-acquires its blue color and dissolves in the alcohol. The same solution is obtained by dissolving solid Prussian blue in a mixture of equal volumes of sulphuric acid and alcohol. When mixed with water or with a large excess of strong alcohol, the solution yields a precipitate of ordinary prussian blue, which retains sulphuric acid even after prolonged washing with dilute alcohol. Ethyl hydrogen sulphate does not dissolve Prussian blue, and hence the phenomena just described cannot be attributed to the formation of this compound.

ON THE NATURE OF COBALT AND NICKEL.

By Dr. Fleitmann.

As the author first found in the *Chemiker Zeitung* an account of the surprising communication of HH. Krüss and Schmidt (Amer. Jour. Phar., 1889, p. 132) that a new, hitherto unknown, metal was present in nickel and cobalt, he ventures, in the interest of the nickel industry, upon the following remarks. He has repeatedly and carefully examined the most different sorts of nickel and of cobalt oxides of commerce, according to the indications of HH. Krüss and Schmidt, and even on taking 50 gm. of material he has not been able to obtain ponderable quantities of a substance which would justify the supposition of the presence of a new metal.

The author's experiments were not dictated by an intention to intrude into an investigation which HH. Krüss and Schmidt have reserved for themselves. The interests of the nickel industry, in which he has been concerned for thirty-eight years, made it his duty to decide as quickly as possible so important a fact as the existence of the new metal. After obtaining negative results in his experiments he wrote on Feb. 13th to Dr. Krüss, requesting a small portion of the new metal so as to convince himself of its existence. Dr. Krüss replied on March 29th, promising to forward some preparations. Up to date they have not arrived, and as the writer's continued experi-

ments have proved fruitless, he suspects that "gnomium" exists merely in the imagination of its discoverers. He expects, therefore, from HH. Krüss and Schmidt either a confirmation or a withdrawal of their communications.

According to Dr. Fleitmann's experiments he concludes: (1). That if cobalt and nickel are regularly accompanied by a hitherto unknown metal this can exist only in extreme traces, and not in quantities up to two per cent. (2). That these traces have no essential influence on the ductility of the nickel, which, in its present state of purity, is as flexible and ductile as the softest iron. (3). That the methods of purifying nickel, patented by Dr. Krüss, are devoid of practical value since they are in part not novel and in part not feasible.

If the nickel and cobalt of trade in the state of hydroxide are treated, as according to Krüss and Schmidt, with excess of sodium hydroxide, we certainly obtain, according to the purity of the materials, varying quantities of the different impurities present in these oxides along with small quantities of nickelous and cobaltous oxides. According to the origin of the sample the impurities consist of small quantities of lead and zinc oxides, arsenic, manganic, molybdic, and silicic acids, alumina, cerium oxides, and chromic acid. The nickelous or cobaltous oxide dissolved does not in general exceed $\frac{1}{10}$ per cent. of the oxide used. If it is separated from the other impurities which exist in solution in the alkaline liquid and converted into nickelous or cobaltous oxide, it is afterwards insoluble in soda-lye, whence its solubility appears to depend on the presence of those impurities, especially arsenic acid, silica, and alumina. If the alkaline extract of the above impurities is mixed with hydrochloric acid until the precipitate formed at first is re-dissolved and ammonium carbonate is then added, there is obtained a wonderful mixture of oxides and acids well calculated to serve as a puzzle. It seems to the author not unlikely that HH. Krüss and Schmidt have met with such mixtures. Their precaution to form the alkaline extract at a low temperature (10°) confirms him in his conjectures, as precipitates often appear on applying heat. Manganic acid and dissolved lead oxide are sometimes converted into manganic oxide and lead peroxide. Still this is merely conjecture, and he is ready to be convinced to the contrary by more decisive proofs than the discoverers have as yet advanced for the existence of the new element.—*Chemiker Zeitung*, June 12, 1889.—*Chem. News*, July 5, p. 9.

ARTIFICIAL DIASTASE.[1]

By A. Reychler.

When freshly prepared wheat gluten is digested at 30–40° for a few hours with very dilute acids, considerable quantities of albuminoïds are dissolved, forming an opalescent solution. The acids or acid salts employed were hydrochloric acid, hydrogen potassium sulphite, phosphoric acid, alkaline dihydrogen phosphates, acetic acid, formic acid, tartaric acid, and lactic acid.

This opalescent solution is not coagulated by boiling; it gives a precipitate with a few drops of very dilute potash, soluble in excess. It becomes clear on adding two volumes of alcohol, but a turbidity is generally produced when the alcohol is added in large quantities. It gives a precipitate with potassium ferrocyanide, soluble in a large quantity of acetic acid. Mercuric chloride seems to produce no precipitate.

Tincture of guaiacum and hydrogen peroxide produce an intense blue coloration, but not if the solution has been previously boiled or treated with too much acid. A solution of the gluten from wheat flour (10 grams) in acetic acid ($\frac{1}{1000}$ 50 cc.), gives this reaction most distinctly. This behavior, according to Lintner, is characteristic of diastase.

The gluten solutions have a fermentive action similar to that of diastase, but they lose their property partially or completely when boiled, or in presence of alkalis or of too much acid. The gluten from 20 grams of wheat flour was digested for a few hours with 100 cc. of an aqueous solution (500 cc.) of potassium dihydrogen phosphate (1 gram). 2 cc. of the solution were then added to starch (2 grams, 88 per cent.) made into a paste with water (250 cc.), and the mixture kept for five hours at 40–50°. The solution thus obtained reduced 135 cc. of Soxhlet's alkaline copper solution.

The soluble albuminoids present in wheat flour also contain diastase, as can be proved by Lintner's reaction. Starch (4 grams) made into a paste with water was digested for two hours at 60–66°: (1) with an aqueous extract from 1·6 grams of wheat flour, and (2) with a similar extract to which 2 cc. of hydrochloric acid ($\frac{1}{1000}$) had been added. At the end of this time the solutions still contained unchanged starch, and reduced 100 cc. and 210 cc. of Soxhlets solution respec-

[1] *Ber.*, xxii, 414–419; from *Jour. Chem. Soc.*, June, p. 621.

tively, showing that a trace of acid increases the rapidity of fermentation.

The disastase-like action of the soluble albuminoïds in ungerminated barley can also be proved experimentally, and the author gives a table showing the reducing power of the solutions obtained when ungerminated barley (2 samples), maize, and malt, respectively, mixed either with water alone or with water and a trace of acetic or metaphosphoric acid, are kept at a suitable temperature. Under the above conditions, the starch in the grain is only slowly acted on; it was found that fermentation takes place much more rapidly when starch-paste is treated with a relatively small quantity of ungerminated barley. The results of experiments in this direction, in presence or in absence of a trace of acetic acid, are also given in a table.

The author considers that it is not improbable that in the germination of barley and other seeds, the solubility and fermentive power of a portion of the albuminoïds is produced by reactions similar to those which occur when gluten is dissolved in very dilute acids.

ALKALOÏDS OCCURRING WITH COCAÏNE.[1]

By A. Einhorn.

Liebermann and Giesel have recently shown that when the amorphous bases occurring with cocaïne are boiled for an hour with hydrochloric acid, they are chiefly converted into ecgonine and acids. This fact has long been known technically. The bases are warmed for three to four days with concentrated hydrochloric acid, the solution is diluted with water, and after separating the acids, concentrated and mixed with ether, whereon most of the ecgonine hydrochloride separates immediately. The filtrate, after freeing from alcohol and ether, is kept for some months so that the rest of the salt may separate, then diluted with water to precipitate small quantities of resinous matter, and again evaporated to a syrup.

The author has investigated a syrup obtained in this manner. It was dissolved in water, separated from resinous substances, mixed with soda and the bright yellow precipitate, which consists chiefly of an amorphous substance, dried and extracted with absolute alcohol. The filtrate from the yellow precipitate contains anhydroecgonine, which can be isolated by acidifying with hydrochloric acid, removing resin-

[1] *Ber.*, xxii, 399–402; from *Jour. Chem. Soc.*, June, p. 628.

ous impurities by shaking with ether, evaporating and extracting the crystalline residue with absolute alcohol.

A *chloro*-derivative, probably $C_{26}H_{32}N_3ClO$, is obtained in colorless needles, when the alcoholic extract from the yellow precipitate referred to above is evaporated, the residue boiled with water to remove inorganic compounds, and recrystallized from alcohol with addition of animal charcoal. It melts at 220·5°, and is not changed when warmed with silver nitrate solution. It forms salts with the halogen acids; the *hydrobromide*, $C_{26}H_{32}N_3ClO$, 3HBr, crystallizes from methyl alcohol in colorless prisms, and has an intensely bitter taste.

When anhydroecgonine is heated at 270° with hydrochloric acid, methyl chloride, hydrocarbons, ammonia, methylamine, and resinous products are formed together with two basic compounds, both of which are volatile with steam. These two bases can be separated by dissolving in hydrochloric acid and treating with sodium nitrite. One yields a nitroso-compound which, on decomposing with hydrochloric acid, is converted into a crystalline *hydrochloride*. The other base is not acted on, and is obtained unchanged when the solution is made alkaline and distilled; it yields a sparingly soluble *aurochloride* melting at 212°. A distillate, smelling strongly of pyridine, is obtained when the bases are evaporated with hydrochloric acid, and the residue distilled with zinc-dust. The distillate contains a hydrocarbon and two new bases which can be separated by means of their aurochlorides. The more readily soluble salt melts at 108°; the other contains 46·96 per cent. of gold, and does not melt when heated at 280°.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-seventh annual meeting convened in Odd Fellows' Hall in the city of San Francisco on the afternoon of Monday, June 24th. President M. W. Alexander, of St. Louis, occupied the chair and called the meeting to order. After prayer offered by Rev. W. H. Scudder, Mayor Pond was introduced and extended a cordial welcome to the members on behalf of the pharmacists and citizens of San Francisco and of the Pacific Coast, to which Mr. Ebert, of Chicago, responded. Dr. Melvin, president of the California College of Pharmacy, next addressed the meeting, expressing the gratification of the pharmacists of the Pacific Coast that the frequently extended invitation had at last been accepted, and giving a hearty welcome to the visitors present. After a brief response by the President, Mr. Alexander read the annual address, referring to the qualifications for membership, the work by sections, the financial

tion of which is contemplated by the American Medical Association; to pharcondition and the different funds invested by the Association; to the approaching revision of the pharmacopœia; to the section of pharmacy the organizamacy laws and examinations by the pharmacy boards. The address was well received and was ordered to be referred to a committee of five for consideration.

A number of invitations were received, accepted and ordered to be acknowledged.

The Secretary of the Council presented the names of candidates recommended to membership, and read the minutes of that body since the last annual meeting; the business transacted by Council was approved.

The Committee on membership reported the roll to contain the names of 25 honorary and of 1,263 active members; during the past year 116 members had joined, but the loss during the same period was by resignation 34, dropped 60, died 16, total 110.

The report on delegations stated that credentials had been received from the Colleges of Pharmacy of California, Chicago, Cincinnati, Illinois, Louisville, Maryland, Massachusetts, National (Washington), New York, Philadelphia and St. Louis; from the State Pharmaceutical Associations of Alabama, Arkansas, California, Connecticut, Dakota (South), Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, Virginia, Wisconsin; from the local Associations of Dauphin Co., Pa.; Detroit, Mich., and St. Louis Microscopists; and from the Alumni Associations of the California, Chicago, Cincinnati, Philadelphia and St. Louis Colleges of Pharmacy.

When, subsequently, the Nominating Committee was appointed it was found that the following States were represented: Arkansas, California, Connecticut, Florida, Illinois, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Ohio and Pennsylvania. At subsequent sessions representatives were also present from Oregon, Arizona and Honolulu.

Several short committee reports were read, and at the request of the Committee on the revision of the Pharmacopœia a special session was ordered to be held for the consideration of the report, the session to convene after the adjournment of the second session on Commercial Interests.

Second Session.—After the approval of the minutes of the first session and of the Council, the report of the Nominating Committee was received, and the following officers were elected for the ensuing year: Emlen Painter, New York, president; Karl Simmon, St. Paul, W. M. Searby, San Francisco, and J. W. Eckford, Aberdeen, Miss., vice-presidents; Leo Eliel, Indiana, Wm. S. Thompson, Washington, D. C., and J. H. Dawson, San Francisco, members of Council for three years; the treasurer, permanent secretary and reporter on the progress of pharmacy were re-elected.

An invitation was received for holding the next annual meeting at Asbury Park, N. J. This with others was referred to a committee consisting of Messrs. Painter of New York, Ebert of Illinois, and Robinson of Florida, for consideration and report.

Reports of officers and committees being in order, a letter from Prof. Diehl was read in reference to the report on the progress of pharmacy, which ac-

cording to the by-laws is to embrace the publications to the end of June; it is intended to introduce some new features in the introductory part of the report.

The Committee on National Formulary will endeavor during the ensuing year to collect criticisms and suggestions, and arrange matters for active work.

The report of the Treasurer showed a total income from July 1, 1888 to May 1, 1889, of $12,067.37, which includes last year's balance of $2,376 07; annual dues, $5,070; from National Formulary, $4,145.52, the remainder being for certificates, proceedings sold life membership fees, etc. The current expenses since July, 1888, were $5,718.33, for National Formulary, $3,258.59; for funds, $124, total $9,120.92, leaving a cash balance on hand May 1st, of $2,946.45.

The Treasurer called attention to the fact that for three years past the current expenses of the Association had exceeded the amount of the annual dues collected.

The chairman of the Council reported the value of the different funds to be as follows: Ebert fund $811.78; Centennial fund $1,499.57; Life Membership fund $9,710.41; making the total invested funds $12,021.76.

The Secretary's statement on the National Formulary gives the total cost of printing and distributing the book up to April 30, at $3,440.29; total receipts, $4,141.12; bills receivable, $553.86; bills payable, $99.68; stock on hand, bound and unbound, 2249 copies; value at wholesale prices of 1378 copies sent to members and others, $708.70; total expenses of National Formulary Committee since 1885, $241.67.

These reports had been examined by the Auditing Committee and compared with the books and were found to be correct.

The Committee on Publication reported the total cost of last year's volume to be $4,056 77, referred to the favorable account of the National Formulary, and directed attention to the considerable reduction in price of the older volumes of the Proceedings, which it was hoped would induce many members to complete their sets.

The Committee on Prize Essays recommended the awarding of the Ebert prize for 1888, to Joseph F. Geisler of New York, for his essay on the morphiometric assay of opium.

Considerable discussion took place when the Committee on the next meeting requested on the part of the members present an expression in regard to the locality for holding the meeting. Besides Asbury Park, New Orleans, St. Louis, Indianapolis, New York, the White Mountains and other places were mentioned. The Committee subsequently reported in favor of holding the next meeting in New York City; but an amendment prevailed selecting Old Point Comfort, Va., where the next meeting will be convened on the second Monday in September, 1890.

The draft of a bill relating to pharmacists in the U. S. Navy was presented, and after some discussion was referred to the Section on Legislation with full power to act.

The Section on Commercial Interests held two sessions on Tuesday afternoon and evening. The Chairman and Secretary being absent, Mr. Leo Eliel occupied the chair and Mr. J. H. Dawson acted as temporary secretary. The discussion was mainly on the alcohol tax, a subject which had been discussed at previous meetings, and at the meetings of the various State Societies, so that new arguments could hardly be presented. Though there was some opposition to the

removal of the internal revenue tax on alcohol, the large majority of those present were evidently in favor of it and adopted a resolution requesting the legislative section to take such action in reference to the abolition of this tax as the sentiment of the Association indicates.

A communication from Mr. T. D. Crawford, of North Carolina, relative to the indiscriminate sale of narcotics, was referred to the Section on Legislation.

The rebate plan intended to prevent the underselling of proprietary articles was discussed at some length, and after consideration by a committee, the outlines of a plan were approved by which it is presumed the cutting of prices can be prevented.

The section elected Leo Eliel, of South Bend, Ind., chairman, and F. B. Kilmer, of New Brunswick, N. J., secretary.

A Special Session, called for the consideration of the report of the committee on the revision of the U. S. Pharmacopœia, convened on Tuesday evening at 9.15. The report which makes recommendations relating to the principles and general features of the revision, was accepted and the recommendations taken up seriatim. Pending the consideration of the first recommendation, a paper was read by Prof. Bedford strongly advocating the retention in the pharmacopœial formulas of parts by weight. A lengthy discussion followed, most of the speakers favoring the measuring of liquors in making preparations; incidentally the process of percolation was alluded to, and Mr. Ebert contended that the old process of maceration would yield more uniform and reliable results in the hands of most pharmacists than displacement.

The admission into the pharmacopœia of synthetical remedies, the authority of the National Formulary, liquid extracts differing in strength from those at present recognized, etc., formed the subjects of the remaining recommendations, which were adopted in the following manner:

1. That it is the sense of this Association that in the next revision of the U. S. Pharmacopœia, all preparations—at least those for internal use, which are usually prescribed and administered by measure, be ordered to be made by weight and measure as in the former pharmacopœias; but that the Committee of Revision shall be at liberty to use the system of parts by weight in all other cases, and that they may use any other system as long as the measures or weights are commensurate with each other, and of such a character that the strength of the product or of any given fraction thereof can be readily ascertained without tedious calculations.

2. The Pharmacopœia should be relieved of all antiquated or little used material, such as a number of crude drugs, galenical preparations (simple and compound pills) etc.; all of which could be safely turned over to the pharmaceutical profession.

3. In view of the absolute necessity of recognizing such important medicinal chemicals as antipyrine, sulfonal, etc., the Association considers that the existence of a patent does not *in itself* constitute a bar against the reception of any medicinal agent in the pharmacopœia; but it is suggested that the revisers act with great care and circumspection, so that no patented substances except those of established worth, and irreplaceable by other remedies, be recognized, and that such compounds be recognized by descriptive chemical names and not by therapeutic names.

4. Regarding tests of identity and purity, it is the sense of this Association

that they shall be made as complete and rigid as it is practical to make them, and as will be fair to the manufacturers, the dispensing pharmacists and the purchasing public. While freedom from *injurious* admixtures should be insisted upon, the absence of an insignificant percentage of inert and unavoidable contamination can often be insured only at a greatly increased cost. A judicious decision should be made in each case, and the co-operation of the manufacturers invited so as to settle upon a basis which may be equitable to all.

5. This Association emphatically reiterates its declaration made at its last annual meeting that the Pharmacopœia shall and will be the sole official authority for all remedial agents treated of therein; that the National Formulary shall be authority only for such as are not covered by the Pharmacopœia, and that the authority of the National Formulary shall cease whenever the Pharmacopœia supersedes any of its processes or directions.

6. That alcoholic preparations representing fifty per cent. of the drug be adopted so far as practical to replace fluid extracts and tinctures.

A suggestion relative to the admission into the pharmacopœia of formulas for compound spirits analogous to compound spirit of juniper was negatived.

The Section on Scientific Papers held two sessions on Wednesday morning and afternoon, and a third session on Thursday forenoon; Professor Painter in the chair and Professor Whelpley secretary. The chairman read an address, making suggestions for regulating the business and facilitating the work of the Section, which, after having been considered by a committee, were approved with some modifications. The following papers were read:

Solution of Magnesium Citrate. Professor L. E. Patch suggests a modification of the pharmacopœial formula with the view of preventing crystallization of the normal citrate, and converting all the magnesia into the salt $MgHC_6H_5O_7$, by somewhat increasing the quantity of citric acid. To prepare six bottles of the solution the following quantities are recommended: 170 gm. citric acid, 78 gm. magnesium carbonate, 480 gm. syrup of citric acid, and 16 gm. potassium bicarbonate. Mr. Ebert and Mr. Maisch stated that they had not met with any difficulty in keeping, when using pharmacopœial quantities.

Arsenic in Wall Paper was the title of a paper presented by Professor D. H. Galloway. About one hundred samples had been examined, of which number twenty-five were free from arsenic, while the remainder contained compounds of that metal varying in quantity from traces to over 600 Mgm. As_2O_3 per square meter. It was stated that an attempt had been made in Massachusetts a few years ago to secure the enactment of a law limiting the arsenic in wall paper to 7 mgm. for each square meter; the bill, however, had failed to become a law. In the discussion following the importance of such papers was dwelt upon, and a resolution was passed that a copy of the paper be sent to the secretary of the American Public Health Association.

The effect of moisture as a preparatory step in the extraction of some drugs was discussed in a paper by Professor J. U. Lloyd. The succulent vegetable tissue in its natural condition is readily permeated by an appropriate alcoholic menstruum. Dried drugs are more difficult to extract, even after having been powdered; but after they have been softened the natural condition is re-established. The author suggests softening before percolation by spraying enough water on the powder; allow this to stand in a closed vessel for a considerable

period and, where possible before packing in the percolator, to sprinkle it with enough alcohol to bring the liquids to the composition of the menstruum used for percolation. The interest in the subject was shown by the discussion, which touched upon the alteration of plant constituents by drying, the generation of new compounds in the presence of water, the popular use of some fresh plants and dried drugs, etc., and it was generally acknowledged that numerous and careful observations were necessary to throw more light on these subjects.

Photomicrography.—A paper by Professor A. B. Stevens and W. H. Krug describes a simple apparatus for taking magnified photographs of sections of drugs. Stained and unstained sections had been used, the latter yielding the better results. This was also the experience of Professor Maisch. Professor Whelpley stated that for the purpose of photographing Arnold's writing fluid makes an excellent stain.

The Pharmacopœial Nomenclature was presented by Professor O. Oldberg. The arguments cannot well be condensed; but the aim of the paper was to show the advantages of making the pharmacopœial titles English in form, using, however, terms only which may be properly used in scientific language; latinic titles were proposed as definitions of the former. Thus official titles would be, for example, Benzoic Acid, Allium, Anthemis, Water, Cornus, Ferric Chloride, to which the following latinic definitions would belong: Acidum benzoicum, Allii bulbus, Anthemidis flores, Aqua, Cornus radicis cortex, Ferricum chloridum.

Wool Fat or Lanoleum.—Mr. C. S. Hallberg treated in this paper of the preparation of this useful drug and gave a number of historical references, showing that this article was the first animal fat used in medicine and that from the beginning it had always been employed mixed with water, as it also exists naturally in the wool combined with water. Arguments were presented against the validity of the patent on its combination with water, and against the exclusive right to the use of the term *lanolin*, this being a descriptive term and not an arbitrarily selected name.

Donovan's Solution.—Mr. E. Goodman states that in Cincinnati this preparation is rarely prescribed, Fowler's solution being preferred; and since it deteriorates on keeping, its dismissal from the pharmacopœia is advocated. Mr. Ebert, however, stated that in his locality the solution is frequently prescribed.

A simple ureameter was described in a paper by Prof. L. E. Sayre; the construction of the apparatus is simple and inexpensive.

Cantharidin in Pharmacy.—Professor F. A. Grazer suggests that cantharidal collodion be made with cantharidin. For this and other purposes it may be easily and cheaply prepared sufficiently pure by every pharmacist, following Procter's process of exhausting the powder with chloroform, recovering the solvent by distillation, and removing the fat from the residue by carbon disulphide or petroleum benzin.

Syrup of Dextrin.—The pharmaceutical uses of the syrup which is commercially known as "glucose" were discussed in a paper by Mr. F. A. Rometch. The legitimate use in pharmacy was stated to be limited. A dense syrup known as "mixing glucose" (specific gravity about 1·40) is useful for suspending oils, resinous substances, powders, etc. Mixed with syrup of gum it is

useful for many pill masses and will prevent the pills from becoming too dry. It is a protective agent for ferrous iodide and for hydriodic acid and has some advantages when used with the hypophosphites. For soda water syrups it should be used rather sparingly, say in the proportion of one part to three or four parts of cane sugar syrup. Mr. Ebert thought this syrup of dextrin could be utilized also in other ways, provided it was free from sulphurous acid and sulphites, which are present in some commercial articles as preservatives. Glucose cannot be used for adulterating cane sugar without forming a solid mass. Messrs. Calvert, Hallberg and Searby participated in the discussion.

Relative value of various pepsin tests, by F. A. Thompson. The paper was read by title and referred to the publication committee. It compares the results obtained with the methods directed by the U. S. and the British Pharmacopœias, the National Formulary and with several modifications. The author favors complete solution of a definite amount of coagulated albumen as the requirement.

Commercial Belladonna root.—Thirty-five samples, including the ground and powdered root, were assayed by W. Simonson, who found the total amount of alkaloid to vary between 0·220 and 0·776 per cent. In view of the variable quality an authoritative standard of value in alkaloid, at least for the lower limit, is very desirable. Referring to such great variations in the alkaloidal strength of such a powerful drug, Mr. Calvert suggested that the inaccuracies resulting from the use of weights and measures were quite insignificant.

Hypophosphorous acid and ferrous solutions were reported on by Mr. John Devine. The acid was found unsuitable as a preservative for solutions of alkaloids; but ferrous solutions were kept unchanged, a temperature of 70° F. being better than 60°, and concentrated solutions kept best, even with a relatively smaller amount of the acid. As to the mode of action, the author suggested that possibly the hypophosphorous acid might be converted into phosphinic acid or an ether. Prof. Maisch expressed the hope that the author might succeed in proving such a change to take place; he also stated that, without the addition of a preservative agent, syrup of ferrous iodide prepared with hot simple syrup kept well in consequence of the formation of invert sugar. Mr. Ebert had also observed that pure cane sugar would not prevent decomposition, but that invert sugar would do it. Mr. Redsecker had experienced no trouble in keeping this syrup unaltered in large bottles with the addition of a little hypophosphorous acid. Mr. Ray's experience coincided with this. Prof. Searby suggested that the acid might have this preservative action by inverting the sugar.

Compound Galenical Preparations.—Prof. Remington arrives at the conclusion that all compound galenical preparations which have not thoroughly established their usefulness throughout the country, should be dropped from the next revision of the United States Pharmacopœia; and that none should be admitted to that authority except such as will stand the same test of extended usefulness; and if admitted, the processes must commend themselves to the practical worker as models of simplicity and elegance.

Chinese Extract of Opium.—Mr. John Calvert has observed the process of manufacturing this extract as followed by the Chinese experts in San Francisco; it is as follows:

The quantity of opium operated upon, so that a workman can do a fair day's

work, is usually about 16 or 18 pounds. The balls are placed in tepid water to soften the surface, and they are washed by hand to remove grit, leaves and other foreign substances. The material is then placed in a shallow concave brass pan, which is kept gently heated over the naked charcoal fire, and by means of the wooden pestle, is kneaded into a soft paste. When homogeneous, the softened opium is uniformly spread over the inner surface of the pan, and patted down by the hand, so as to give it a smooth surface. The heat is continued until the greater part of the moisture has evaporated, and the opium has become so solid that the pan can be turned over. The direct heat of a very small fire is now allowed to act directly on the face of the opium by turning the pan upside down. This has to be carefully and skillfully done. As soon as the surface of the material has become sufficiently hardened, it is deftly removed in thin layers, and this is continued until all the opium has been taken from the pan, except the dried portion which remains attached to the bottom and sides of the vessel. This is scraped off.

The crusts which were laid aside in the former operation are now put on a gridiron a few at a time, with the greatest care, to avoid breaking them, and are toasted over the charcoal at a low temperature until they have become perfectly crisp. The crusts are then placed in one of the brass pans, covered with warm water, and left standing until the next morning.

On resuming work the infusion is drawn off into buckets through baskets lined with muslin strainers.

The brass pan is slightly tilted, and by means of a knot of vegetable fibre the liquor is drawn off over the edge of the pan without loss. The roasted opium is drained, and a second quantity of warm water added, with as little breakage of the crusts as possible, and the extraction is finished with a third lot of water. Only the first and second infusions are used for the extract; the washings and weak infusion are employed for the extraction of the next batch. There seems to be no precise rule as to the quantity of water for making the infusion, the crusts are merely covered.

The infusion is then mixed with some egg albumen and a part of it is placed in the largest of the brass pans over the naked charcoal fire, and is heated, skimmed and boiled constantly. The pan is not filled, but room is allowed for frothing, and fresh portions of warm infusion containing albumen are added from time to time as the bulk diminishes. During the boiling there are several matters to be attended to, such as keeping up the fire, or banking it up with ashes if too hot, prevention of boiling over by addition of small quantities of the infusion, or of water, and keeping the sides of the pan free from hardened extract. This is effected by water and by fiber scrubbing brushes. When all the infusion has been added, and the evaporation has proceeded as far as is considered to be necessary, the pan is removed from the fire, and the extract constantly stirred by means of a wooden spatula in a current of air produced by fanning until cool and uniformly mixed.

The yield of extract varies according to the kind and quality of opium. Eighteen pounds of first quality Turkey Opium generally yield about ten pounds of this extract.

The greatest watchfulness is exercised over the roasting or toasting part of the process. Although a small exposed corner of the crusts may become charred occasionally, the object of this operation is to expose the opium to such a

heat only, as to render it porous, to do away with the quality of stickiness, which is said by some authors to be produced by an easily decomposed caoutchouc like substance, and to allow the aqueous extractive matter to ooze out of the material without stirring.

Notwithstanding the constant repetition of cautions in all the text-books, dispensatories and other pharmaceutical literature respecting the care to be observed about subjecting opium to heat, I do not find that there is any appreciable difference in the yield of morphia when opium has gone through this barbarous process. Whatever changes may take place among the other proximate constituents is not known, but I am quite satisfied as to the fact that the natural morphia salts, protected by extractive, are not decomposed, or only to a very small extent, by such a heat as is necessary for the desired alteration of the valueless or inert matters contained in Opium.

The discussion brought out the facts that some of the extracts used by the Chinese for smoking contain little or no morphine, and that the effects are probably not mainly due to the amount of morphine present.

How to Conduct a Quiz Class is the title of a paper read by Prof. Whelpley, which is not adapted for being abstracted.

Maize Oil.—Two papers were presented by G. W. Kennedy and by C. A. Heinitsh. Attention having been directed to this oil by Mr. Lloyd (AMER. JOUR. PHAR., 1888, p. 325), the two essays furnish further evidence regarding the applicability of maize oil to pharmaceutic uses in the preparation of liniments, ointments and plasters. It was stated that at present much of this oil was sold as a substitute for olive oil, taking the place of cotton seed oil.

Morrhuol.—By digesting cod liver oil with alcohol, S. A. McDonnell obtained, on evaporation, 3·5 per cent. of extract; no information could be given as to its therapeutic value.

Oleate of Morphine, 10 per cent. strength, may be extemporaneously prepared according to S. A. McDonnell, by heating on a water bath 450 gr. oleic acid with 53 gr. morphine sulphate and adding gradually 25 minims of concentrated ammonia water, stirring constantly until a perfect solution takes place.

Reaction of Some New Remedies.—S. A. McDonnell applied the concentrated acids of the shops and tincture of ferric chloride to sulphonal, salol and acetanilid which produced no change. Phenacetin was colored yellow by nitric acid; the acid is added to the aqueous solution and the mixture heated to boiling. Antipyrine is colored blood red by tincture of ferric chloride.

A Pointer in Dispensing.—S. F. Hughes, receiving a prescription for ung. hydrarg. ℥i to be divided into twenty papers, dispensed it by rolling out the ointment like a pill mass, using lycopodium on the pill.

Oil in ground Flaxseed.—Seven samples of flaxseed meal obtained in the Chicago market when exhausted with carbon bisulphide, were found by W. A. Puckner to yield from 36·12 to 37·98 per cent. of fixed oil. (See also AMER. JOUR. PHARM., 1887, p. 286 and 601.)

Division of Powders.—The paper presented by Prof. E. B. Stuart and E. B. Tainter of Chicago, gives the results of experiments made by 37 dispensers with three prescriptions and shows the variations in the total weight and in the weights of the powders dispensed in the ordinary way.

Fabiana imbricata.—M. Rockwell examined the drug microscopically, furnishing a drawing of the transverse section, and chemically, the constituents found

being an alkaloid, two resins, a fluorescent compound, a glucoside, a tasteless crystalline compound and volatile oil. (See two papers on constituents of Fabiana in present number.)

Tincture of Boletus laricis.—A patient investigation of a difficult subject, by C. W. Phillips. The paper, which cannot be well abstracted, gives the experiments made with the view of ascertaining the nature of the precipitate occurring in the tincture; the literature regarding composition, and processes for separating the important constituents. A large number (44) specimens were shown in illustration of the subject matter. The author states that if the cathartic effect of boletus is desired a tincture of the red resin would be a proper preparation; but if the anti-diaphoretic effect be desired, it is suggested that the pure agaric acid be used, or a saturated solution of the acid, of which ten to twenty minims would contain a full dose. (See also AMER. JOUR. PHARM., 1889, p. 253.)

Preparations for the Skin.—A paper by F. B. Kilmer treated of the various agents and vehicles used for external medication. The substance named *oleite* was particularly dwelled upon as a suitable base for many purposes. It is a soda soap of sulphoricinoleic acid, prepared by treating castor oil with sulphuric acid at a moderate temperature, washing with water, then with ether and finally neutralizing the remaining substance with soda. *Gelatoles* are ointments made by dissolving the drug in oleite, combining with a suitable base which if fatty is partly saponified, adding an absorbent for water if required, and finally gelatin to give consistency.

The poisonous plants of California was a valuable contribution by Prof. H. H. Behr, enumerating plants, indigenous and introduced, which are either poisonous or suspicious.

The red coloring matters of the scarlet geranium have been studied by Prof. Wenzell, and one of these principles was obtained crystallized. The species used was Pelargonium zonale.

Bitter waters were discussed by Dr. Enno Sander; the variations in the composition of natural waters and the differences in composition of some bottled waters furnished good arguments for artificial carbonated bitter waters of definite and unvarying composition.

Picrotoxin in beer was the rather startling title of a paper by S. F. Hughes. After considerable discussion about the various charges of adulterations practised with fermented and malt liquors, it was stated by Prof. Wenzell that picrotoxin had been found only in a cheap variety, commonly called steam beer in San Francisco, and that the higher grades of beer had all been free from this adulteration. The small amount of Cocculus indicus formerly imported into this country was cited as a proof that it could not be used for such a purpose to any extent; but those present could give no definite information as to the amount of cocculus imported of late years.

The Pines of California was the subject of an interesting paper contributed by Mr. Jas. G. Steele, describing the eighteen Californian species of Pinus according to characters, distribution and uses.

The reading of the papers being finished, a vote of thanks was given to the retiring chairman, and the newly elected chairman, Prof. H. M. Whelpley, took his seat. Mr. Chas. F. Dare, of Bridgeton, N. J., is the secretary of the section for the ensuing year, and Prof. J. M. Good, of St. Louis, the third

member of the committee. A report was presented by the committee on the chairman's address, and some rules were adopted regulating the order of business. The Section then adjourned.

Section on Pharmaceutical Education.—The chairman, Prof. Bedford, presided, and Prof. A. B. Stevens was appointed secretary. In the chairman's address the necessity of pharmaceutical education was dwelled upon, and that this is recognized was shown by the number of educational institutions, there being 20 colleges and 12 schools of pharmacy located in 17 states, the District of Columbia and Canada; also by the legislation regulating the practice of pharmacy, 33 of the states and the District of Columbia having pharmacy laws, while one (Maryland) had a local law, and the remaining 14 states and territories were still without legal enactments on the practice of pharmacy. The number of graduates in pharmacy actually engaged in the business was estimated at 4000; about 2000 are supposed to have attended instruction without graduating, while the total number of stores where medicines are sold or dispensed, was estimated to be 38,000, with fully 75,000 persons engaged in them. The total attendance at the pharmaceutical institutions during the past year was about 2700 only. Reading alone, it was stated, would never give the kind of information usually retained; the lectures, instructions, laboratories and museums of the colleges bring together that which the student cannot otherwise procure, and for which the expense to him is but trifling compared to the benefit he may derive if he will. Among the subjects for consideration the chairman suggested are the following: 1. What is the duty of the fraternity towards our educational institutions? 2. What suggestions can be advanced to better the methods of teaching at present employed? 3. What can be done to secure more interest in, and larger classes for educational advantages?

The Committee on preliminary examinations presented a report which was well received. The report argued that the colleges were designed to do the greatest good to the largest number; that in the admission of students a middle course must be pursued; that many youths enter the drug business from sheer listlessness or without proper conception of the intellectual capacity and mental training necessary; that the proprietors of stores are largely responsible for taking learners without sufficient inquiry into their scholarship; that the educational qualifications exacted of apprentices are closely allied to those exacted for admission to the colleges, and that it is much easier to exact conditions before a youth enters upon his apprenticeship, than several years afterwards. The recommendations of the report were:

1. That this association recommend its members and all others in the retail drug business to refuse to take into their employ as apprentices or learners any boys or young men who have not been graduated from a grammar school of their respective states, or who do not present evidence of having received an education equal to that required for such graduation.
2. That colleges of pharmacy demand as a condition to entrance upon their courses of instruction a certificate of graduation from a State grammar school, or from an institution whose course of instruction is known to them to equal that of the State grammar schools, and whose requirements for graduation are not less stringent.
3. That irrespective of the possession of a diploma from a grammar school, all applicants be examined in the following branches: English composition, percentage, proportion and rudimentary Latin. (This recommendation is made because of the differences in the courses of instruction in the public schools in

different states, and in view of the fact that experience has taught us that many of the candidates have left school for some years and forgotten what they had only imperfectly learned.)

4. In the absence of such grammar-school diploma the prelimary examinations should embrace:—

(*a*) A thorough examination in the English language, including orthography (chirography), use of capital letters, punctuation, grammatical construction.

(*b*) Mathematics, common and decimal fractions, percentage, proportion, involution and evolution and denominate numbers.

(*c*) Geography and rudimentary Latin.

5. That all colleges announce that in the year 1891 they will require the candidates to pass an examination in algebra in addition to the foregoing.

A paper by Prof. L. E. Sayre on *training in Latin* was read; it recommended, instead of a strictly philological course, a series of exercises on subjects directly connected with the drug business.

A paper on *theoretical and practical training* by Prof. Remington, arrived at the conclusion that it is better for the student to have practical experience before entering college, better for the professors, (because of the greater intelligence of the students), better for the college, (because it makes better students), and better for the community (for the the same reason); but it was acknowledged that there may be an exceptional case here and there which would require special consideration, and the ultimate object of the student might not be the usual one, that of becoming a retail pharmacist.

The paper created some discussion, Prof. Stevens arguing in favor of the training in the sciences appertaining to pharmacy previous to entering upon the drug business; but the other speakers preferred the course recommended in the paper.

Several papers were presented, and being considered unsuitable for publication in the Proceedings, were laid upon the table.

A suggestion was made that each section prepare for the members some questions, the answers to be brought before the proper section.

Mr. Hallberg spoke of the injury done to the cause of education by colleges having two courses of instruction during the year, and graduating students within one year, or after having attended two such consecutive courses. Several members coincided with the views expressed, and it was understood that at the meeting next year the subjects should be fully discussed and acted upon.

The officers of the section for the ensuing year are, Prof. Bedford, chairman; Prof. Stevens, secretary, and Mr. H. M. Whitney, of Lawrence, Mass.

Section of Pharmaceutical Legislation.—In the absence of the members of the committee, Mr. Emlen Painter was appointed chairman, and J. M. Maisch, secretary.

A letter was read from C. W. Day explaining his absence and advising the formulation of a plan for the interchange of certificates of registration by state boards of pharmacy. Mr. Manning moved that a committee be appointed for this purpose, but stated that the motion was made at the request of a member of the Association, and that he was not in sympathy with it. After considerable discussion the motion was defeated by a unanimous vote.

A paper advocating a similar course, was presented and laid upon the table.

A paper by Dr. Eccles on "The Aim of Examinations by Boards of Pharmacy" was ordered to be printed.

A letter from C. E. Reynolds, Apothecary, U. S. Navy, was read, inclosing the draft of a bill for the granting of a warrant to the Apothecaries of the Navy. The chairman and secretary of the section were duly authorized to memorialize Congress in favor of the bill.

Attention was called to the fact that for two years the Committee on Legislation had neglected to report the newly enacted or amended pharmacy laws for publication in the Proceedings. The committee to be appointed was instructed to collect them, as far as possible, for publication in the next volume, and to report others next year.

The Committee on Pharmaceutical Legislation for the ensuing year is the same as that for the preceding section, and consists of Messrs. P. W. Bedford, A. B. Stevens and H. M. Whitney.

The final session of the Association took place on Friday morning, June 28th. After the reading of the minutes of the preceding sessions and of the Council, the report on the president's address was received and the following resolutions were adopted:

1. That the Council be directed to practice rigid economy in regard to expenditures and appropriations until our indebtedness is paid and we have accumulated a surplus of at least $2000.
2. That the Secretary be directed to devote a page in each volume of our published Proceedings to the "Ebert," the "Centennial" and the "Life Membership" funds, and that upon this page shall be printed a brief history of the origin, money value and use to which the proceeds of each fund may be applied.

Mr. Simmon moved an amendment to the by-laws with the object of consolidating the sections on education and legislation. The subject lies over until next year.

Mr. Chas. E. Dohme, of Baltimore, was elected local secretary, and Mr. J. H. Redsecker, of Lebanon, Pa., a member of Council in the place of Mr. Painter.

Mr. Eliel moved that hereafter the printing of the papers for use at the meetings be discontinued; but accepted an amendment offered by Mr. Simmon, which was adopted, that the cost of printing should not exceed $100.

The installation of officers was then proceeded with. Secretary Maisch stated that the office of permanent secretary was first created in 1865, when he was nominated for this position without his knowledge; that he resigned in 1869, but was subsequently induced to withdraw his resignation; that now, having been elected for the twenty-fifth year, he considered it but just to himself and the Association to present his resignation, to take effect next year.

Votes of thanks were passed to the retiring officers, the local secretary, the druggists of the Pacific slope, their wives and ladies, the daily press, and to the citizens in general.

The president was empowered to appoint three delegates to the national convention for the revision of the U. S. Pharmacopœia; also a committee of five on Arrangements, of which the Local Secretary shall be chairman; this committee to be also the Committee on Entertainments.

The Association then adjourned, to meet again at Old Point Comfort, Va., on the second Monday of September, 1890.

The Excursions and Entertainments, in connection with the thirty-seventh

annual meeting of the American Pharmaceutical Association, were of the most enjoyable nature, and will long be remembered by those who were present. As previously announced two excursion parties from the East had been arranged for, one starting from St. Louis by way of Kansas City and through Kansas reaching Denver Sunday morning, June 16. The other party left Chicago somewhat later than contemplated, and passing through Iowa and Nebraska, arrived at Denver on Sunday afternoon. The druggists of Denver and of adjacent parts of Colorado met the visitors on Sunday evening at the St. James Hotel, where an informal reception was held, and conducted them afterward to Trinity Methodist Church where a recital on the grand organ was given for their entertainment. On Monday a complimentary excursion was tendered to the visitors up Clear Creek Cañon to Silver Plume, and was thoroughly enjoyed by all.

On Tuesday the two excursion parties separated again, one going by way of Cheyenne and Ogden directly to Salt Lake City, and after spending there a couple of days, to San Francisco. The other party tarried until Thursday morning at Manitou and Colorado Springs, visiting the different springs, falls, cañons and caves, and then journeyed over the picturesque Denver and Rio Grande road through the Royal Gorge of the Arkansas, over Marshall pass (10850 feet altitude), the cañon of the Gunnison, the plains of Western Colorado and the desert of Eastern Utah to Salt Lake, thence westward through Nevada, crossing the Sierra Nevada, to San Francisco.

The entertainments planned at the place of meeting by the druggists of San Francisco and of the Pacific Coast, commenced on Monday evening June 24 with a grand reception and promenade concert at the Palace Hotel, which was the head-quarters of the Association during the week. The parlor floor of this mammoth structure was especially reserved for this occasion.

On Tuesday afternoon the resident ladies met in the reception parlors of the Pacific Hotel to act as escorts to the visiting ladies to the panorama of the Battle of Vicksburg and through Chinatown. Wednesday morning was again set aside for the enjoyment of the ladies; the route of the carriage drive was through the U. S. Reservation and Presidio, and through Golden Gate Park to the Cliff House, where the famous seal rocks were viewed, the return trip being through the park. Thursday morning Sutro Heights were visited, via the scenic route of the Park and Ocean Railroad, a magnificent view being afforded of the Pacific Ocean.

A banquet was given at the Palace Hotel on Wednesday evening, the hall and the tables being elegantly decorated. Dr. S. H. Melvin, president of the California College of Pharmacy, presided. A number of toasts were proposed and responded to, and a surprise was in store for the hosts when President Alexander presented to the College, on behalf of Prof. Runyon, a well executed portrait of Emlen Painter, formerly one of the professors of the College, and now a visitor to the city and the president-elect of the national association. The evening's entertainment closed with dancing in the parlors of the hotel and promenading in the corridors.

Thursday evening was devoted to a visit to Chinatown. Theatres, bazaars, restaurants, private houses, etc., were inspected under the guidance of trusted and experienced leaders.

After adjournment, on Friday afternoon, a visit was paid to Oakland, where

the local druggists took charge of the visitors, and showed them the city and its surroundings. Lake Merritt, Pleasant Valley, the Sulphur Springs and many other places of interest were visited, the day closing with a banquet at Tubbs Hotel, where brief speeches were made by a number of members previous to final adjournment.

Saturday morning closed the week's entertainments with an excursion around the Bay of San Francisco, on board the steamer James M. Donohue. The route was around Alcatrez Island to the Presidio, Fort Point, the Golden Gate, Saucelito, Raccoon Straits, Red Rock and past Oakland, Alameda and Hunter's Point. Shortly after two o'clock the landing was effected and after bidding their hosts good bye the visitors returned to the hotel, and a large number of them took the afternoon train for San José and for the Hotel del Monte, on the Bay of Monterey, where the Sunday was spent. The stately palms and cacti, the large live oaks and coniferous trees, the ancient town of Monterey, with its relics, the drive along the beaches, through cypress grove, etc., formed novel attractions for the visitors.

Monday, July 1st, was the day which found most of the visiting members engaged in making preparations for leaving hospitable San Francisco. A party of about fifteen made the journey to the famous Yosemite Valley with its towering rocks and grand waterfalls, took a look at the peaks of the Lyell group of the Sierra, and paid a visit to the big trees, *Sequoia gigantea*, in the Mariposa grove, where the famous "grizzly giant," the "wawona" (through which the stage passes), and many other forest giants have their home. Most of the members on their homeward journey went northward, passing Mount Shasta and through the Willamette valley, to Portland, Ore., and Tacoma, Wash. Excursions were made up the Columbia river, and on Puget Sound to Seattle and Victoria; and on the line of the Northern Pacific Railroad some stopped at Spokane Falls, Helena and other places, and then visited the Yellowstone National Park, with its numerous hot springs, active geysers, grand waterfalls and the magnificent and picturesque grand cañon.

Most of the Eastern members stopped for a day or two in Minneapolis, St. Paul and Chicago, and then returned to their homes, some having journeyed over 8,800 miles by railroad and about 300 miles by stage. It was a memorable trip for each one. Aside from the works erected by human hands, the varied scenery, the changes in climate, the strange flora, the native forests, the groves of tropical trees planted for timber or fruit, the extensive deserts, the broad and fertile valleys, the wild cañons, the snow-capped mountains and the natural wonders of Yosemite and of Yellowstone Park made impressions which can never be effaced from memory.